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THE TRAGEDY OF THE SCOTTISH HIGHLANDS

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> " Ill fares the land, to hastening ills a prey,
> Where wealth accumulates, and men decay.
> Princes and Lords may flourish, or may fade ;
> A breath can make them, as a breath has made :
> But a bold peasantry, their country's pride,
> When once destroy'd can never be supplied."
>
> GOLDSMITH.

To enable the reader to understand the cause of the present depopulation of the Highlands, it is necessary to state briefly the historical sequence of events during the past two hundred years.

The misfortunes which have led to the condition of the people of the Highlands began with the '45 rebellion. Previous to that date the inhabitants of the Northern Highlands were governed by clan chiefs and feudal lords, and the number of men held by each chief or lord represented his importance or strength ; hence the desire to keep as many men as the land would support. But when the Government of George II became the established authority, the necessity for fighting-men ceased and the nominal owners of the land turned their attention to utilising it to their own advantage. The rental of the land under crofters or smallholders was about sixpence per acre, but a sheep-farmer was prepared to pay as much as ninepence per acre. Later, when the value of sheep and wool began to decline, and the desire arose among the rich for more deer forests, the landowner gained once more, deer forests being let for rentals of up to one shilling per acre. Dealing with the evictions which took place in consequence of these changes, Sir John Stirling-Maxwell says in his report of the Deer Forest Commission : " The desire to increase production and to afford new and better opportunities to people whose existence seemed peculiarly poor and stagnant in a period which was elsewhere one of rapid progress undoubtedly weighed with the best landowners as much as the desire to increase their rent roll. But when their action is viewed now in the cold light of history, it is clear that the power of wholesale eviction by private persons was one which ought never to have been permitted, and one which was rendered doubly odious

in this case by contrast with the patriarchal relations which existed between chieftain and clansmen down to the rising of the '45."

The clearances can be described under three headings :—

(1) Eviction by force.
(2) Eviction by raising the rent.
(3) Eviction for being concerned in the Jacobite rising on the forfeited estates.

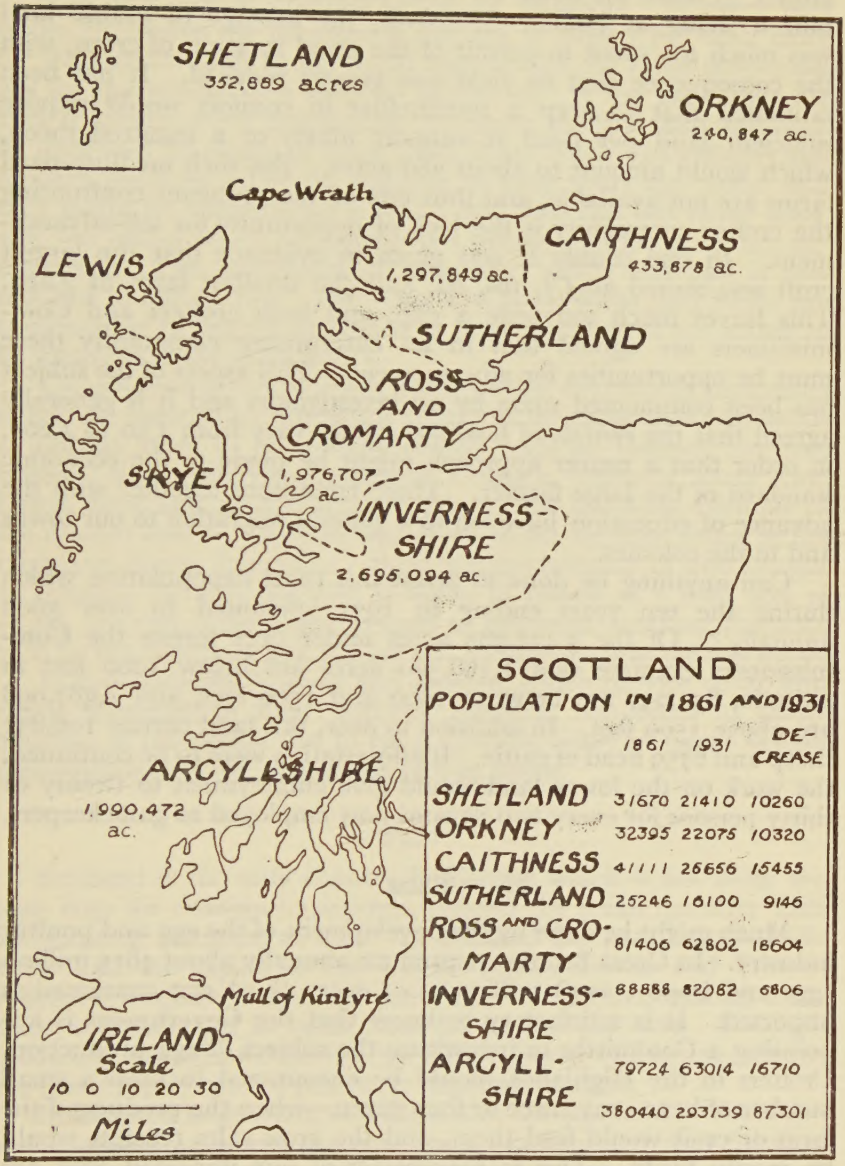
Many evicted families migrated to our colonies, but a large number accepted the offers of the owners to settle on small patches of land along the sea-shore. These clearances, which began about 1780, continued for over one hundred years until in 1884 the Report of the Crofters Commission led to legislation which ended evictions and gave the crofter fixity of tenure. Hitherto he had been only a yearly tenant, and in spite of the fact that he built his own house and brought into cultivation the land allotted to him, he was not entitled to any compensation for the improvements he made.

In this paper I am dealing chiefly with the seven Northern counties generally referred to as the crofting counties, viz. :— Shetland, Orkney, Caithness, Sutherland, Ross, Inverness and Argyll. These together have an area of 8,992,727 acres, or nearly the half of Scotland. The population during the peak years (1850-60) numbered 380,446, but decreased during the following seventy years to 301,153, a reduction of 79,293 and an annual average decrease of 1133, in a period when the population of the whole of Scotland increased by 1,953,812.

Deer Forests

In 1750 the area devoted to deer consisted of small patches of high ground in Aberdeen, Inverness, Sutherland and Ross, but from 1784 to 1882 large additions were made to the deer forests and in the latter year the area under deer was computed to be 1,975,209 acres. By 1892 this had further increased to 2,472,133 acres, and it reached its peak, amounting to 3,584,966 acres, in 1912. By 1920 several forests were returned to agricultural pasture farm, or afforestation. When the people were turned off the land and huddled along the sea-shore they were able to get a subsistence partly from sea fishing, partly from the manufacture of kelp from sea-wrack, an industry from which some landowners received substantial incomes. Then the making of whisky was a profitable business : a boll of barley costing 20s. to 30s. could be made into an anker of whisky valued at £10. The fishing ceased with the introduction of the trawler, the trade in kelp failed with the discovery of iodine in South America, and the making of whisky was prohibited by law.

With these three sources of income gone, the Highlander had perforce to depend upon the produce of his croft. The crofts,



Index diagram showing the counties under consideration, with their areas and population in 1861 and 1931.

which averaged about 5 acres of arable land and from 20 to 40 acres of rough pasture land, were much too large to allow a crofter to leave his home for long periods, and too small to give him a living at home. Moreover, the acreage of arable land was much too small to permit of the usual rotation of crops, with the consequence that its yield was greatly reduced. It has been estimated that to keep a smallholder in comfort would require sufficient land per head to support ninety or a hundred sheep, which would amount to about 280 acres. But such medium-sized farms are not available, and thus one of the problems confronting the crofter community is the lack of opportunity for self-advancement. In one county it was given in evidence that the largest croft was rented at £7, 16s. od. and the smallest farm at £292. This leaves much too wide a gap, and both crofters and Commissioners are agreed that in an enterprising community there must be opportunities for advancement. This aspect of the subject has been commented upon by all investigators and it is generally agreed that the rentals of holdings should vary from £30 to £200, in order that a nearer approach might be made to the economic standard of the large farmer. These conditions together with the advance of education have led to a general migration to our towns and to the colonies.

Can anything be done to arrest this rural depopulation which during the ten years ending in 1931 amounted to over 3000 annually? Of the 3,432,385 acres under deer forests the Commissioners estimate that 1,168,520 acres are below 1000 feet in altitude, 834,257 are between 1000 and 1500 feet, and 1,387,098 are above 1500 feet. In addition to deer, this land carries 106,831 sheep and 6759 head of cattle. If afforestation were to be continued, the work on the lower land would give employment to twenty or thirty persons for every two persons now employed as gamekeepers.

Eggs

Much might be done by the development of the egg and poultry industry. In Great Britain we produce annually about 4815 million eggs and import 2248 million—*i.e.*, every third egg consumed is imported. It is satisfactory to know that the Government is appointing a Committee to investigate the subject of egg production. Crofters in the Highlands should be encouraged to keep a small number of hens—say three or four dozen—when the produce of the farm or croft would feed them, and the gross sales receipts would be mostly profit. This is how many of our imported eggs are produced. To make this industry successful, villages and small districts would need to combine and quick transport be arranged so as to supply the southern market with guaranteed fresh eggs. The Orkneys are the only group of islands where by means of co-operation the production of eggs has been successfully developed.

Transport

The most urgent question is that of transport. In every part of the Highlands the inhabitants pay ten to twenty per cent. more for their goods than in the south and receive the same proportion less for everything they have to dispose of. If the Highlands are ever to regain their population, transport by land and sea must be improved by means of more piers, better roads and cheaper and quicker methods. The St. Kildans of sixty years ago asked that they might be visited twice a year ; but even this was never done, and the island which supported 180 people in 1700 is to-day uninhabited. The population of Mingulay, which was 140, is now reduced to one or two. The islands of Soay, Rona and Foula are complaining of neglect and some of their inhabitants are asking to be removed to the mainland.

One solution of this problem would be that the railway companies should be induced to run motor transport for passengers and goods at railway rates to the remote centres such as Tongue, Durness, Scourie, Kinlochbervie, Lochinver, Coigach, Ullapool, Loch Ewe, Lewis, Skye and all the Western Isles. The following example of the present cost of transport was given to me by Miss Bruce of the Highland Home Industries : three hundredweights of iron bought in Glasgow for 17s. per cwt. is taken to Harris at a total cost of 4s. 6d. per cwt.—more than it costs to Australia—making the price paid by the consumer 21s. 6d. per cwt., while in towns the cost is 15s.

In countries like Norway and Sweden, which provide cheap and quick transport to their outlying districts, two-thirds to three-quarters of the people live in rural districts, while in Great Britain three-quarters of the population live in towns.

Peat

Scotland is the only country in Europe which is not using the peat bogs for economic purposes, beyond the small quantity used for domestic purposes as fuel. In Holland the peat bogs provide moss litter for export to the United States, Britain and France. When the bogs are exhausted the land is turned into smiling cornfields and increases in value from 6s. to 42s. per acre. For fuel, producing gas and electricity, the Trade Board of Sweden informs me that 270,287 tons of peat were exported in 1936.

In England large tracts of what is now the best land in Yorkshire and Lincolnshire were once peat bogs. In Scotland near Stirling, where the peat was removed and floated down the Forth, the land so reclaimed is now the best arable and pasture land in the district. In the higher parts of Lanarkshire there are also large stretches of land which formerly were peat bog and are now pasture fields. At present 550 acres of bogland near Carnwath, and 140 acres in Lewis, are being turned into good pasture and agricultural land.

In response to my inquiry, the Secretary of the Irish Development Board has kindly sent me the following information : "I wish to state that there are about three million tons of turf cut in Ireland annually, and this turf is mainly cut by farmers for their own use. At the moment my Board, under the auspices of the Government, are developing bogs on a large scale with machinery. At present we have two bogs in production, one a small unit of 10,000 tons per annum, in Offaly, another of 20,000 tons in Kerry, and a large unit will come into operation later this season, of 120,000 tons, near Portlington. The present proposal is to use turf from this unit for the production of electricity, and a power station on the bog is projected.

"There is also a briquette factory with capacity of 50,000 tons per annum, established in Kildare." The question of cultivating the land where the peat has been removed by machinery is kept in view, and the cultivation of land from which turf has been removed by hand is a commonplace in Ireland.

The Tweed and Knitting Industries

The making of tweed is almost the only active industry in the Highlands, and none is more suited for being taken up in spare time. The development of what is known as Harris tweed is largely stimulated by the Committee of the Highland Home Industries, who dealt with 887 workers during 1936 and paid £15,218 in wages. In Lewis and Harris there is a system of giving out the yarn to workers in their own homes, the weaving being done by piece-work and many of them earning £3 to £4 weekly. Knitting is chiefly carried on in the Shetlands, and in 1935-36, £4310, 14s. 6d. was paid to the workers. The initial expense is small, the skill is easily acquired, and all that is wanted is eagerness to learn and co-operation among the workers.

Among other efforts made to bring industries to the Highlands, the canning factory at Inverness should be mentioned. If it is successful—as I hope it will be—it will not only give employment to a number of people but will lessen the rabbit pest, which has become not only a menace in the Highlands but a loss to farmers throughout Great Britain. It is a matter of regret to many of us that the proposed scheme for the manufacture of carbide in the west has not materialised. I think the Highlands would have benefited by such a scheme, for which the country is very suitable on account of its water resources.

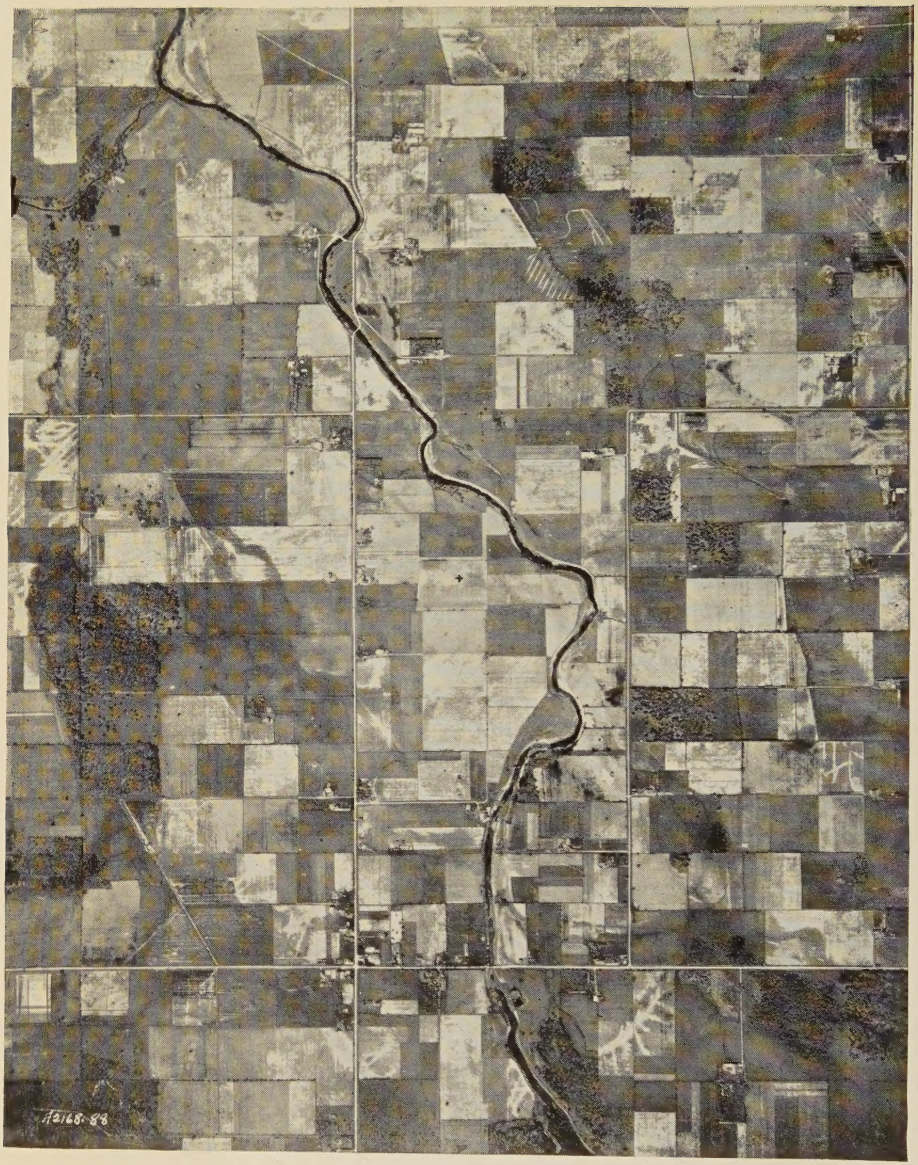
Summary

To sum up, I suggest :—

(1) Better roads, more piers, cheaper transport.
(2) The development of poultry farming.
(3) The division of the land into holdings of various sizes.

[*Seton Gordon.*

Crofters' picturesque dwellings in Harris.



[*By courtesy of the Royal Canadian Air Force.*

PLATE 1. View from the air showing the pattern imposed by the system of land surveys.

(4) The encouragement of the manufacture of Harris tweed.
(5) The removal of peat and the improvement of the land.
(6) Provision for summer visitors.

I am not overlooking the fact that to carry out any of these suggestions would cost money. The landowner would get less and he would require compensation. More money can be obtained to-day from land that is used purely for sporting purposes than from that which is let for agriculture. The cost of reclaiming land is now eight to ten times as great as it was one hundred years ago. The old black house cost about £10 : the modern house costs from £800 to £1000. Medical service, nursing, postal arrangements and education must receive attention, and the more sparsely a country is populated, the more difficult and expensive these services become.

If it is desirable from a national point of view to retain a healthy and strong population in the Highlands, the full use of the land must be obtained, and the inhabitants must be encouraged to develop every form of industry for which the Highlands are suitable. The problem is a national one, and the nation will have to decide whether deer for the sport of the few, or a stable population of men and women, is best for the nation.

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PENINSULAR ONTARIO : A PRIMARY REGIONAL DIVISION OF CANADA [1]

By J. R. Whitaker, University of Wisconsin

Lying south of the Laurentian Shield and almost enclosed by the Great Lakes is Peninsular Ontario (Fig. 1), one of the most productive and densely populated areas of Canada. It is notable alike for the trim, prosperous appearance of its rural areas, and the stability and national importance of its towns and cities. Comprising less than 1 per cent. of the area of the Dominion,

Peninsular Ontario has 24 per cent. of the population (Fig. 2). It is, moreover, one of the hearth lands, the culture centre, in fact, of English-speaking Canada. In writing of this area a few years ago, Knowles said, " It was the growth of population in Ontario that began the anglicization of Canada. . . . That Canada is now British with a French province, and not French with English settlements like raisins in a pudding, is due to the settlement and subsequent economic history of Ontario, originally known as Upper Canada." [2] Except for a small part of the St. Lawrence Lowland, Peninsular Ontario includes most of the early settlements made by the British in Upper Canada. To present the bases and elements of the cultural geography of this primary division of Canada is the purpose of this paper.

The Land

The Ontario Peninsula is a mosaic of glacial and lacustrine plains (Fig. 1). The local relief ranges from less than 50 feet to 500 feet, exceeding the latter figure only along a part of the Niagara Escarpment. The till plains belong to the most recent stage of continental glaciation, and the lacustrine plains were developed under marginal lakes associated with the formation of the Great Lakes. Both types of land forms occur in large, clearly developed areas, and also locally as interspersed fragments. These glacial and glacio-lacustrine deposits constitute an almost complete veneer over a section of the cuestiform plain which borders the Laurentian Shield. On this plain of well-indurated sediments, predominantly limestone and shale, pre-glacial stream erosion developed one major cuesta, and two which were low and apparently discontinuous. The Niagara Cuesta remains to-day the most prominent topographic feature of the Peninsula, the Onondaga is almost completely obscured by drift, and the Black River, outcropping within a few miles of the Laurentian Shield, appears as a discontinuous north-facing cliff of 50 to 150 feet all the way from the east end of Lake Ontario westward to Georgian Bay.

Although affected by the last glacial advance, the drainage is systematic rather than deranged. Small inland lakes and swamps or marshes are generally absent and stream courses are fairly direct, although interrupted by small falls and rapids. Only in a restricted area are lakes, swamps, marshes and deranged stream courses characteristic. The higher till plains of the Peninsular interior have been carved to a stage of early or full maturity, and even the lacustrine plains are maturely eroded locally. This unusual post-glacial development of stream-eroded topography is due primarily to the steep gradient of the streams, which flow outward from the high compound axis formed by the Niagara Cuesta and the inter-lobate moraine which lies north of Lake Ontario, and to a thickness of drift which permitted rapid dissection to considerable depth before solid bedrock was encountered.

Quite unlike the river links in the Great Lakes system, the rivers within the Peninsula are all small and experience flood levels following spring thaws. The radial arrangement limits each to a small drainage basin, no one of them adequately provided with natural storage reservoirs except along the Laurentian Border. Never really suitable for navigation, except in the lower reaches of the Trent, Thames and Grand, these rivers were vital, nevertheless, in the settlement of the Peninsula, for they furnished mill sites for the first villages. Small falls and rapids provided suitable sites for hydraulic plants in the days before the introduction of hydro-electricity and the gas engine. Under long-distance electrical

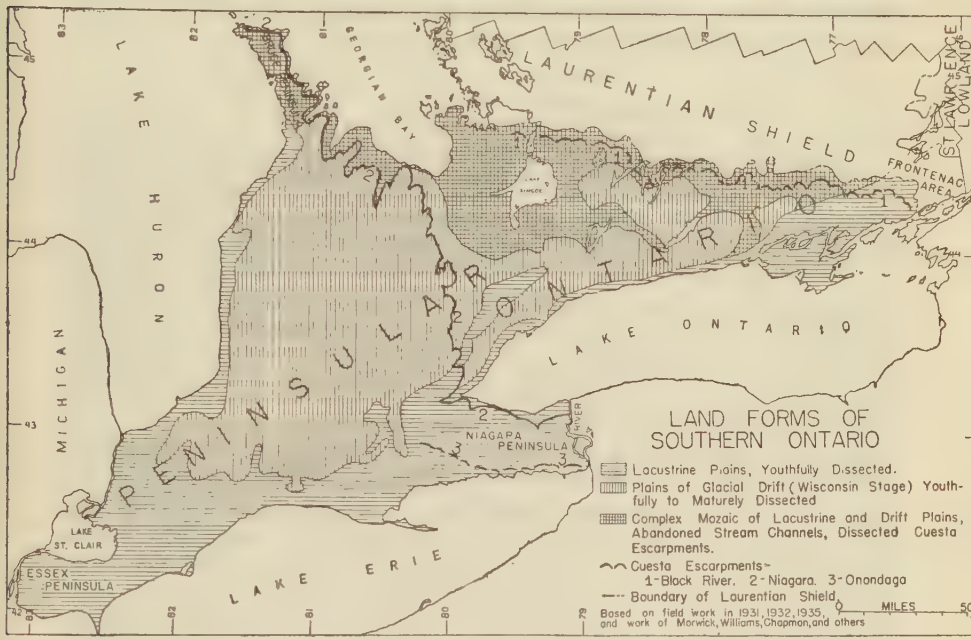

LAKE HURON
GEORGIAN BAY
LAURENTIAN SHIELD
ST. LAWRENCE LOWLAND
FRONTENAC AREA
NORTHERN PENINSULA
SOUTHERN PENINSULA
LAKE ONTARIO
MICHIGAN
NIAGARA PENINSULA
LAKE ST. CLAIR
ESSEX PENINSULA
LAKE ERIE
LAND FORMS OF SOUTHERN ONTARIO
Lacustrine Plains, Youthfully Dissected.
Plains of Glacial Drift (Wisconsin Stage) Youthfully to Maturely Dissected
Complex Mozaic of Lacustrine and Drift Plains, Abandoned Stream Channels, Dissected Cuesta Escarpments.
Cuesta Escarpments- 1-Black River. 2-Niagara. 3-Onondaga
Boundary of Laurentian Shield
Based on field work in 1931, 1932, 1935, and work of Morwick, Williams, Chapman, and others
MILES

FIG. 1.

transmission, the entire area has come to rely upon Niagara power, but the use of these small falls has persisted to a remarkable extent, and for the same purposes as of old, for grist mills, lumber mills and even woollen mills.

Except in the channels of streams and along the margin of Laurentia and the crest of the Niagara Cuesta, the glacial drift covers the bedrock to a depth of tens, locally hundreds, of feet. The mantle-rock is predominantly clayey, derived from limestones and shales, and generally rich in lime. This relation to limestones and shales is explained, in part at least, by the fact that the last movement of the lobes of the waning ice sheet carried glacial drift to the Peninsula from the Central Lowland rather than from the Shield. It is possibly due in part to the sweeping of Laurentia

relatively clean of mantle-rock by earlier ice movement. Sandy islands are scattered throughout the region, forming a minor but significant phase of the regolith.

To sum up, the Peninsula consists of an assemblage of areas dominated by glacial, glacio-fluvial, and glacio-lacustrine deposits, youthfully or maturely carved by post-glacial stream erosion, the whole superimposed on a bold cuesta which has a long back slope and well-developed inner lowland. The very outline of the Peninsula is likewise determined by glacio-lacustrine modification of the belted surface of this ancient coastal plain. Georgian Bay and Lake Ontario occupy parts of the lowland in front of the Niagara Cuesta, and Lake Huron and Lake Erie are related to lowlands which developed on its back slope.

Relation to the Great Lakes

The peninsular character of this region is noteworthy. Actually, it is a compound peninsula, with Bruce, Essex and Niagara peninsulas, each possessing a considerable degree of individuality. Almost surrounded by Great Lakes' waters, which in the aggregate equal 163 per cent. of the extent of the Peninsula, this area reveals, more than any other part of the Great Lakes region, the assets and limitations which the Great Lakes system directly and indirectly presents, such as the extensive lacustrine plains, the proximity to lake ports, availability of fish resources, marine influence on climate, and the relation to the Great Lakes traffic lanes.

Trade centres developed here, as in other parts of the Great Lakes region, at the foci of trade routes related to the Great Lakes : at lake-head points, such as Kingston, Hamilton, Windsor, Sarnia, Collingwood ; at the junction of river and lake, examples being Goderich and Belleville ; at portages, Niagara-on-the-Lake and Chippewa ; at canal termini, St. Catherines and Colbourne ; and at the junction of the lake route and trans-peninsular rail lines, Toronto being the best example.

The railway net and freight rate structure of the region grew up in relation to its position with respect to the Great Lakes. The first lines gave a quick way around Niagara Falls (Fig. 3). Others followed, to provide short cuts in time or distance across the Peninsula, others as traffic feeders for the lake route, and finally others to parallel and compete with the waterway provided by the Lakes. As the railroad threads were woven into a system, Peninsular Ontario became a bridgeway between bodies of water. The lake ports won special rail rates because of the effectiveness of water competition ; and, to avoid partiality among rival towns so near one another, these low rates were applied to all inland points where comparable distances were involved. Thus the entire Peninsula developed under relatively uniform rail rates, although the lake ports thereby lost their advantage over inland cities.

Many of the lake-side cities are also recreational centres. In fact, the recreational areas of the Peninsula are distinctly marginal, for the general lack of lakes and of non-agricultural land in the interior of the Peninsula has there kept recreational features at a minimum. The chain of lakes along the Laurentian Shield is important; otherwise recreational features are confined to the margins of the Great Lakes. Resort centres occur at intervals from the head of Georgian Bay around to Kingston, all benefiting, to some extent, from the relatively cool summers characteristic of the lake shores.

Climatic and Associated Features

The climate of the Peninsula is decidedly modified by lake influences. Seasonal temperature ranges are somewhat less than for any part of North America not similarly placed with respect to bodies of water. A lag in the month of lowest mean temperature is characteristic, February being the coldest month. Rainfall is greater than it would otherwise be and winter cloud is increased. The margins of the Peninsula experience the retarded spring and autumn characteristic of shore lands.

The climate of the area as a whole is humid microthermal. The average July temperature ranges from 66° to 72° F., that of February from 15° to 24°. The average length of the frost-free season varies from 115 days on the highest part of the Niagara Cuesta to 170 in Essex Peninsula. Winter wheat is grown over the whole area; spring wheat begins to appear on the poleward margin, and maize is the dominant crop in the extreme south-west. The distribution of precipitation is remarkably even throughout the year. Differences from place to place in the average annual rainfall range from 28 to 38 inches, a fairly wide contrast but apparently affecting grazing only, for 28 inches is generally adequate and 38 not too much for prevailing crop practices. The entire area is one of great variability of weather, sharing with other Great Lakes areas this trait, and also types of rainfall of contrasted seasons.

Characteristically, the ground water obtainable from shallow wells is abundant throughout, and locally sand beds furnish artesian waters adequate for the needs of small communities. Despite the monoclinal structure of the bedrock of the Peninsula, deep-seated strata are successfully drawn upon for water in only a few places, for water-bearing formations are not abundant. Moreover, the water that is obtained from deep borings is usually rendered unsuitable for human use by the presence of sulphur or salt. The absence of a supplementary water supply from inland lakes is an unfortunate but not a major limitation, since the larger cities are located on the shores of the Great Lakes.

Although swamps and marshes are not generally characteristic of the region in its culturally modified state, there is much land

where the sub-surface drainage is sluggish, on account of the clayey drift, the presence of large areas of flat or gently rolling land, the nearness of the marginal lacustrine plains to the Great Lakes levels, and the presence, locally, of glacially deranged drainage. Large acreages which are not truly swampy, nor even too wet for pasture, are too wet for the satisfactory production of tilled crops unless improved by ditching and tiling.

Locally the drainage has been a principal determinant of the native vegetation, but in the main the vegetation cover is more closely related to climate and soil texture. The area as a whole lies in the hardwood belt, which finds its major extent south of the Great Lakes. Most characteristic is the sugar or hard maple which constitutes a dominant element in farm woodlands and in the residential districts in urban centres, and is a major factor in the wood-working industries of the region. Another characteristic tree, though not as common as maple in the more southern areas, is white cedar, the American arbor vitæ which occurs principally on the wetter lands, on thin soils overlying limestone and on limestone till where boulders predominate.

It should be noted that the Peninsula lies on the northern margin of the central hardwood region of North America, and as such is distinctly a transition area. From south-west to north-east, different species of hardwoods drop out, resulting in a somewhat richer hardwood flora in the plain bordering Lake Erie than along the Laurentian border. On the border of Laurentia, aspen and white birch become abundant on the cut-over lands. The marginal position with respect to hardwoods is revealed also in the presence, and locally the dominance, of conifers. On the areas of deep, droughty sands the original vegetation was coniferous—red and white pine, spruce and balsam fir. Now that the region is primarily one of culled woodlots in which maple is dominant, these differences in the original vegetation are no longer very significant.

In harmony with the natural vegetation and climate, grey-brown forest soils predominate. The marginal position of the area with respect to this group of soils is seen, however, in the appearance of strongly podsolised sands in the vicinity of Georgian Bay. Even so, the grey-brown forest soils extend farther north in Peninsular Ontario than in the Lower Peninsula of Michigan, a condition certainly due in part to the heavier soils of the Ontario area.

Evaluation of the Land for Agricultural Use

In the preceding discussion, an evaluation of the physical *milieu* in terms of the needs of Occidentals in the nineteenth and twentieth centuries has been initiated. Succeeding sections will continue that evaluation on the basis of evidence revealed in the actual process of settling and living on the land. It is deemed desirable at this point, however, to present a few broad conclusions regarding the

suitability of the region for agricultural occupance by peoples of West European stock.

An outstanding trait of the region is the high proportion of the land that is productive—in grasses, grains and special crops. The common lack of such features as bare rock surfaces, erosion scars, extensive swamps and shifting sand dunes is impressive, no matter from what direction the Peninsula is approached. The common absence of large blocks of non-arable land has permitted close settlement to spread over the whole area.

Not only is the land highly productive, but it is also suited to a great variety of uses. To the climatic assets, well known for this type, is added the predominance of clayey soils, with the subsoil rich in lime. These soils have proved suited to such deep feeders as corn, as well as to small grains and hay and pasture. As circumstances have stimulated shifts in types of land use, these edaphic and climatic conditions have permitted a wide choice in response to market opportunities. The great variety of possible land uses gives Peninsular Ontario a marked advantage over most if not all other primary divisions of Canada.

The general absence of prolonged droughts and unseasonable frosts suggests a fundamental though rather obvious trait of the Peninsula—the absence of great natural hazards. No literature dealing with natural catastrophes may be expected from this area. It is in one of the more stable parts of the earth's crust, in a climate of moderately certain rainfall, north of the zone of high tornado frequency, and protected by the Great Lakes from extremely hot or cold winds. Partial failures of crops on account of late spring frosts or damage from hail are experienced, but no widespread loss results. The area is relatively free, too, from diseases specifically related to the natural environment.

This characterisation of the Peninsula as uniformly productive requires major qualifications, however. A hundred to a hundred and fifty years of agricultural settlement have revealed numerous areas which are not well adapted to general farming. The failure of this type of farming on lands of low natural fertility along the north shore of Lake Erie has been repeated in every block of extremely sandy soils in the Peninsula. Locally, the drainage of areas of wet land has not proved profitable either. Agricultural adjustments to these limitations have resulted in considerable variations in the details of land use and density of population.

Rural Population

The rural population is predominantly native-born, of British stock which came from the British Isles either directly or by way of the United States. Settled initially by United Empire Loyalists, who emigrated from the newly-born nation to the south, and later by emigrants from England, Ireland and Scotland, although locally

by German descendants, the Peninsula continues to this day as the culture hearth of English-speaking Canada. Although reservations for American Indians are well scattered over the region, they constitute but one-half of 1 per cent. of the total population. The small proportion of other groups, such as Negroes (three-tenths of 1 per cent.), likewise helps to make for homogeneity.

The density of the rural population is moderate for North America, ranging from 16 per square mile on the Laurentian margin to 64 in the vicinity of the larger cities (Fig. 2). These

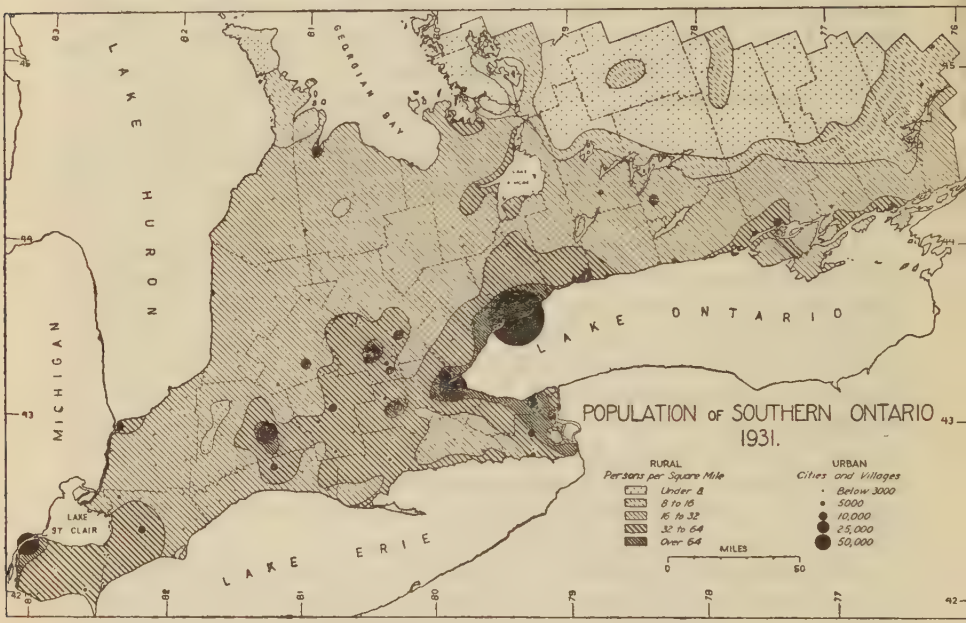


FIG. 2.

ratios, based on township statistics, include, unfortunately, the unincorporated villages. The truly rural population is even more uniformly spread, averaging about 24 persons, or five to six family-units, per square mile.

In this area of dispersed agricultural settlement, each family occupies a residence located on the plot of land which it uses. If more than one parcel of land is tended, it is commonly rented from a neighbouring farmer. Taken for granted in Canada and the United States, this pattern of rural settlement is, of course, by no means general, not even in the western hemisphere. The distribution and density of rural population is understandable in terms of the modes of making a living and of the original land survey which, in the main, preceded settlement.

The Rural Scene

The rural patterns, particularly of population, farms and roads, all conform to the parallelogrammic grill imposed by the Township Survey Orders of 1789. The land was surveyed in township units, each ideally about ten square miles. A base line was laid out for each township, a second line was surveyed parallel to the first but 1¼ miles from it, followed by similar so-called concession lines. An allowance of 40 to 60 feet for a roadway was made on each of these concession lines, and at intervals of two or three miles provision was made for side roads. The farm lots, originally 200 acres in size, were ¼ mile wide and 1¼ miles long, extending the full distance between concession lines. As there was no established practice governing the location of base lines or their relation to the side roads, the orientation of the grill varies from place to place, as does the angle of junction of concession roads and side roads. Despite this variety, the parallelogrammic pattern prevails throughout, constituting a trait in common with the Lake States.

The rural pattern is clearly expressed in the roads and rural land-use units (Plate 1). The concession lines are all-weather roadways, and even more side roads have been built than were originally projected. There are, moreover, but few major departures from the general pattern : (*a*) a few of the early roads cut across country ; (*b*) roads ascend the Niagara Escarpment in harmony with the best gradients ; (*c*) the road net near the Laurentian border is badly interrupted ; and (*d*) locally the road pattern was laid out in haphazard fashion prior to the establishment of the land survey. For the most part, however, neither surface configuration nor contrary practices have interfered with the completion of the parallelogrammic road net.

The farmsteads were spaced initially at intervals dictated by the land survey. Subsequently the farm lots have generally been halved by lines parallel to the base lines, each farmstead now commonly consisting of a hundred-acre plot. The shape or outline of each farm is repeated in the outline of the individual plots within it. The checkerboard thus created is clearly marked by lines of fence, which give a certain precision and stability to the pattern of land use.

This pattern of rural features is generally uninterrupted by large blocks of forest or waste land. The cleared area is continuous, except for farm woodlots, until the narrow transition zone (about ten miles in width) is reached at the border of the Shield. There the northern boundary of continuous cleared land and of the closely meshed net of roads lie on the stony limestone cuesta which borders the Shield, although fingers of cleared land reach along roadways to the Shield and, locally, well into it. The continuity of the agricultural landscape of the Peninsula is an outstanding

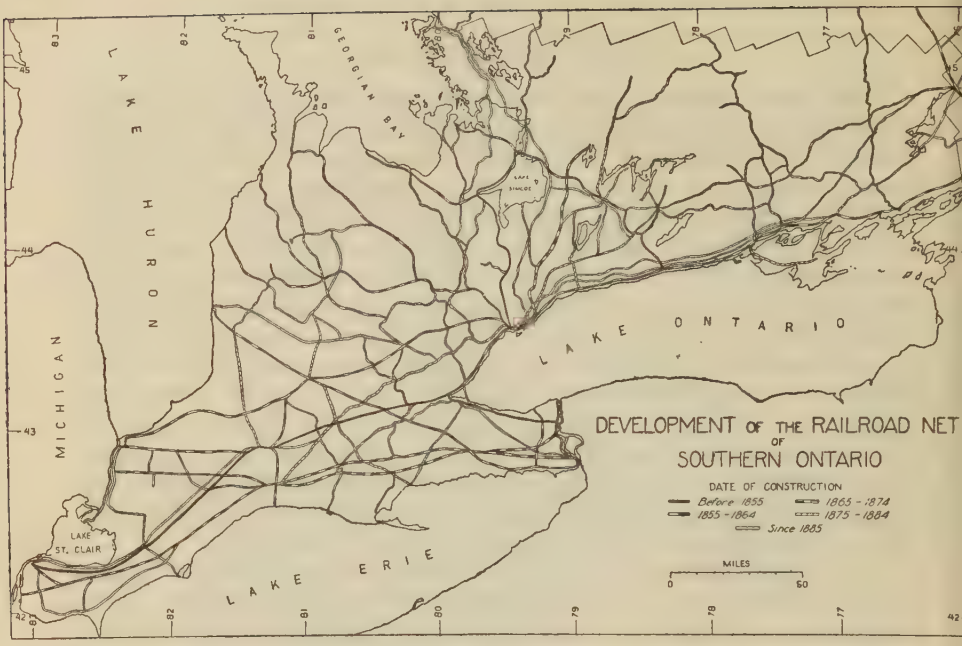

LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
MICHIGAN
LAKE ST. CLAIR
LAKE ERIE
DEVELOPMENT OF THE RAILROAD NET OF SOUTHERN ONTARIO
DATE OF CONSTRUCTION
Before 1855
1855 - 1864
1865 - 1874
1875 - 1884
Since 1885
MILES
0
50

FIG. 3.

LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
MICHIGAN
LAKE ST. CLAIR
LAKE ERIE
PERCENTAGE OF LAND IN FARMS
PERCENT
80+
60-80
40-60
20-40
0-20
BY TOWNSHIPS-1931
MILES
0
50

FIG. 4.

trait, in sharp contrast with the continuous woodland cover of the Shield (Fig. 4).

The Farms of the Peninsula

There is wide diversity within short distances in the composition and organisation of individual farms, so much so that the selection of specific samples is of questionable value in this connection. On the other hand, there is much that is similar in the mode of life of adjacent farms and, what is even more pertinent, a recurrence over the entire area of traits which do not always characterise adjacent farms. In determining the common elements in the agricultural occupation of the region as a whole, search was made for these repeating features and associations.

The usual farmery * includes a house of five, six or seven rooms, which is plain, box-like and porchless, and a fairly large barn, compactly built and unpainted. The houses are generally in good repair, and set in small, well-grassed yards. Four-fifths of these houses are the modest homes of resident owners. Inferior tenant houses and rich estates are both commonly absent, and to European observers the absence of century-old buildings is also striking. The barn provides storage for hay, but not for maize. Quite generally a small building used in dairying is present, such as a small dairy or a loading platform for cream and milk cans. The barns are large enough to include a space for poultry, although occasionally there are separate buildings for that purpose. The farm "workshops" thus reveal the predominance of animal industries in a "general" farming economy.

The Farm Economy

The groundwork of farm economy is a diversified livestock combination—a few milk cows and beef cattle, some sheep or hogs, and poultry, the total making this region one of intensive livestock production: 12-25 livestock units per farm, 25-45 units per 100 acres of crop land, 100-180 units per square mile of farm land (Fig. 5). The particular specialisation varies from sub-region to sub-region, but dairying and beef and poultry production are found in all parts of the region. In a region recognised as one of the major dairy areas of North America, dairy herds are, indeed, a common feature throughout, as are milk-product plants, particularly creameries. Cream, butter and market milk now dominate the dairy industry. County by county, half to four-fifths of the farms are equipped with cream separators. Variations in the place of dairying in the farm economy are so great, however, as to constitute a major difference between subdivisions of the Peninsula. Associated with

* This term is here used in its accepted sense as meaning "the buildings, yards, etc., belonging to a farm." *Shorter Oxford Dictionary*, 1933.

dairying is the production of beef cattle : throughout the region both home-grown and western cattle are fattened for eastern markets. The poultry industry likewise reflects proximity to these markets, with 500 to 1700 head per square mile. Poultry raising is not characteristically found on special farms, but as an adjunct of the general farm. The expansion of poultry production is probably the chief change in the farm economy of the last decade.

The relatively high density of livestock is accompanied by a high degree of land improvement.[3] In general, 80 per cent. or more of the farm land is improved (cleared and cultivable), and much of the remainder is in non-ploughable pasture (1931). The

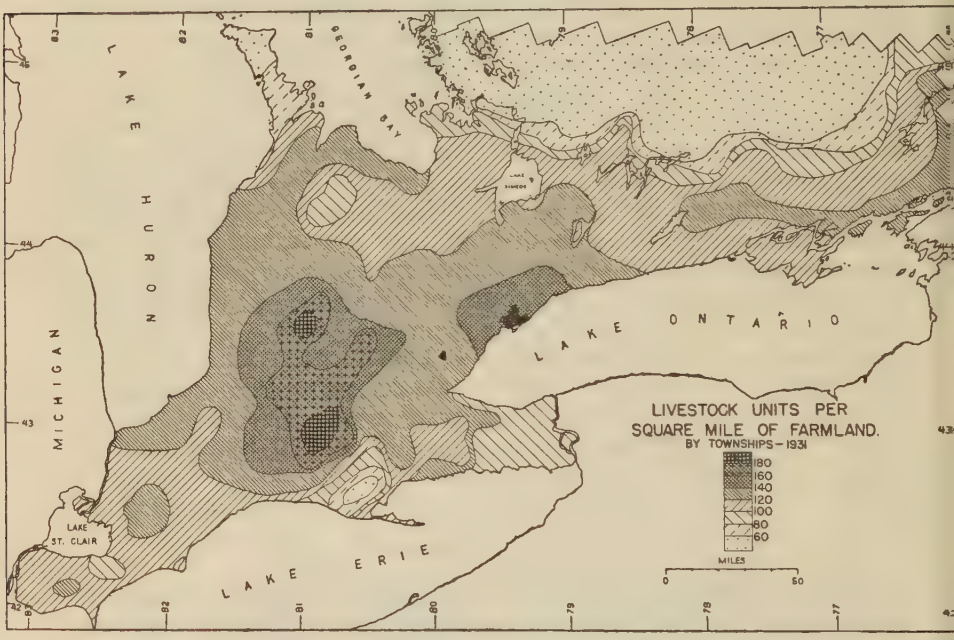


Fig. 5.

high percentage of improved land is not associated with a uniformly high percentage of crop land, however, for the latter varies from 30 to more than 70 per cent. This indicates large dependence on pasture in local areas, the acreage in pasture varying from 20 to 60 per cent. of the farm land. Pasture is favoured by the presence of wet, rough or heavy clay lands, by the prevalent systems of farming, and by the humid middle latitude climate, richest of all climates, probably, in tame pasture grasses and in available forage crops.

Of the crop land, 51 to 78 per cent. is in hay and oats (Figs. 6 and 7 give percentage of farm land, not of crop land). These two forage crops thus dominate areally the cultivated land. In contrast to southern Wisconsin, it is noteworthy that corn for silage

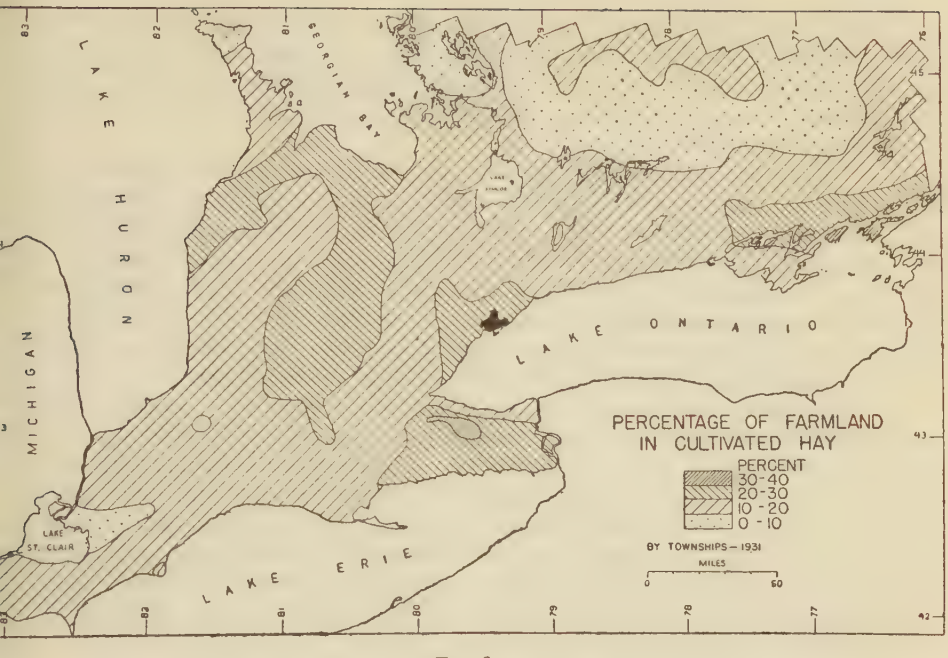

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
PERCENTAGE OF FARMLAND
IN CULTIVATED HAY
PERCENT
30-40
20-30
10-20
0-10
BY TOWNSHIPS — 1931
MILES
0
50

FIG. 6.

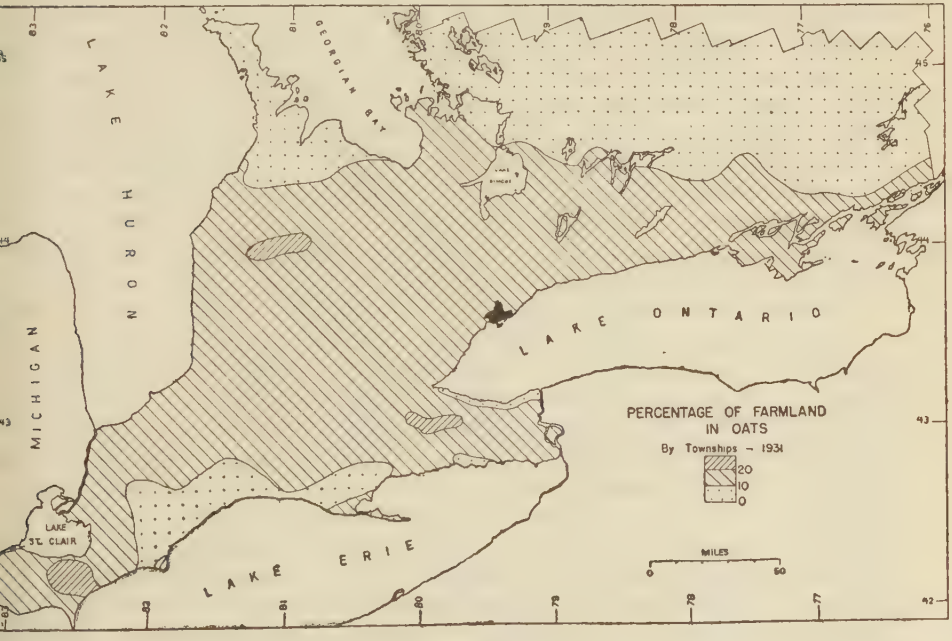

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
PERCENTAGE OF FARMLAND
IN OATS
By Townships — 1931
20
10
0
MILES
0
50

FIG. 7.

is not very significant, only a small area having as much as 5 acres per farm. Wheat, which was once the dominant commercial crop, is still a major one and of outstanding significance locally. It is winter wheat, with some spring wheat in areas of heavy soil where winter killing is common.

With the shift, several decades ago, from wheat to forage crops, there also occurred a change in the distribution of fruit. A generation or so ago, there was a thriving apple orchard on every farm, and decadent orchards are still distributed over the entire Peninsula ; but commercially productive orchards have now become sharply localised in the areas most favoured climatically (Fig. 8). Specialisation in farming and the increasing difficulty of growing good fruit without spraying are given as the reasons for this change.

In addition to a small orchard, generally decadent, the average farm has a woodlot, varying from 4 to 20 per cent. of the farm area, but averaging close to 10 per cent. Clearing back from roadways has caused woodlots to occupy the sites most distant from the roads. In addition, where the terrain is rough, woodlots occur on steep slopes and along valley floors. Occasional plantings of young trees on steep or sandy areas indicate a trend towards the deliberate adjustment of woodlot location to land productivity. Although farm woodlands are everywhere visible, land uses related to commercial livestock production are generally dominant.

This description of the farm economy has stressed the similarities found from place to place within the Peninsula, and it is true that the entire area is dominated by the production of forage crops and livestock. Highly significant, however, both in the region and in the nation, are other land uses. The map, Fig. 9, prepared according to the criteria proposed by Hartshorne and Dicken,[4] reveals the outstanding contrasts. Note particularly the corn (maize) belt and the fruit belt. In addition it is desirable to separate the area of most intensive dairying from the remainder of the hay-pasture-livestock area. This area of intensive dairying is shown on Figure 9, but discussion is reserved for a later report. Despite these local variations, the signal fact in the agriculture of the Peninsula is the commercial output of livestock products.

As farming in North America goes, these land uses are remarkably in harmony with soil resources and conservative of them. Dairying is notably effective in conserving soil fertility, as are the other livestock industries. Locally, sandy soils have not proved durable under general and livestock farming, and consequently have constituted small problem areas well scattered over the Peninsula. These are now being devoted to special crops or returned to woodland. Soil erosion scars are insignificant for the area as a whole, although a problem locally. Wet lands have been drained over the whole Peninsula, surface ditches and tile being found throughout : the ground water conditions are thus well under control. Major adjustments of a highly conservational

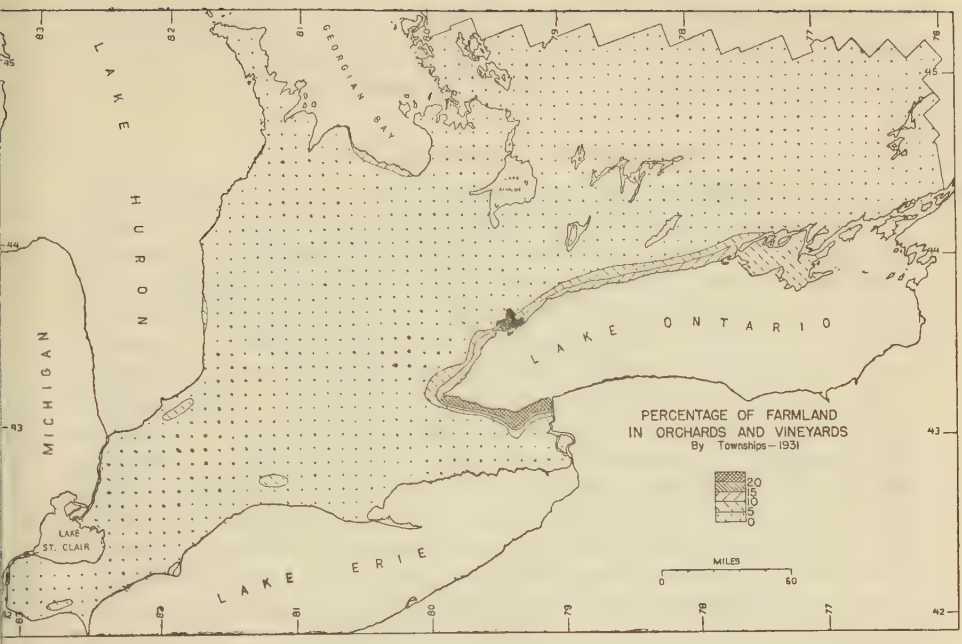

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
PERCENTAGE OF FARMLAND
IN ORCHARDS AND VINEYARDS
By Townships — 1931
20
15
10
5
0
MILES
0
50

FIG. 8.

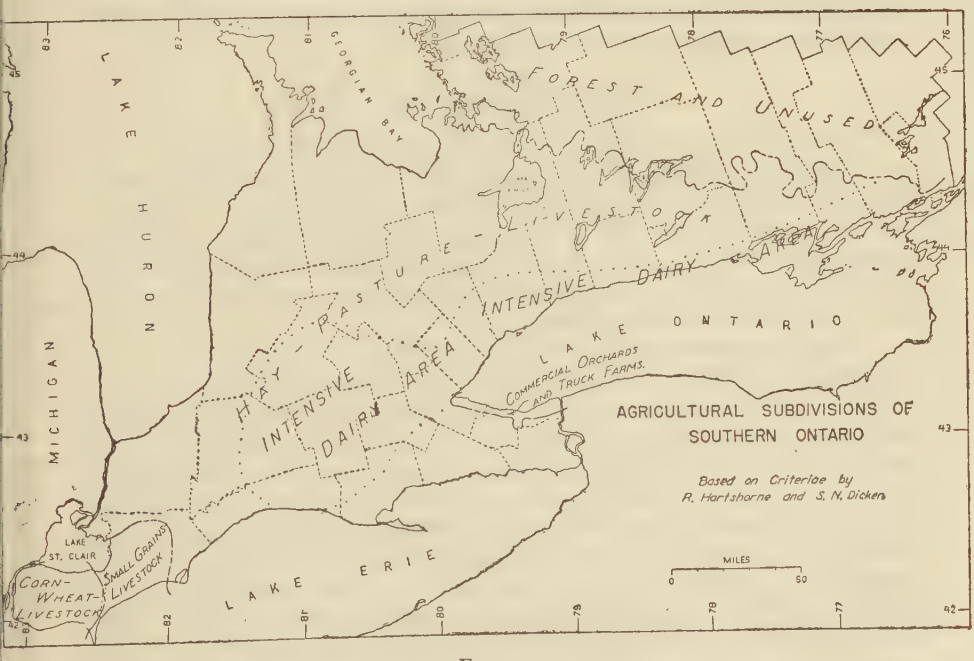

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
FOREST AND UNUSED LANDS
LIVESTOCK AREAS
HAY-PASTURE-LIVESTOCK AREA
INTENSIVE DAIRY
INTENSIVE DAIRY
COMMERCIAL ORCHARDS AND TRUCK FARMS
CORN-WHEAT-LIVESTOCK
SMALL GRAINS LIVESTOCK
AGRICULTURAL SUBDIVISIONS OF SOUTHERN ONTARIO
Based on Criteria by R. Hartshorne and S. N. Dicken
MILES
0
50

FIG. 9.

nature have thus been reached, leaving minor adjustments to be made; unless, as is always possible, a variation in conditions affecting land use forces widespread change.

The Smaller Community Centres

Motor transportation and communication by telephone place the farms of the region in intimate contact with thriving dual-function centres, around which the farm life is thoroughly nucleated. The villages and smaller towns exhibit the same association of features throughout the Peninsula: a sharply localised business district; a bank or two, branches of the larger banks of Canada; a bakery or two; a milk products plant, a creamery generally (Fig. 10); a chick hatchery; a public market square; a hydraulic or hydro-electric grist or flour mill (Fig. 11); one or more wood-working plants, a large proportion of them decadent; garages and gasoline stations; a cross-roads location; possibly a railroad station, equipped with grain elevator and a pen for loading livestock; and residences on spacious lots, commonly with room for a garden. The daily movement between farms and trade centre rises to a crest on Wednesdays and Saturdays, days on which much of the perishable farm produce is sold directly at the public market square. Even in the villages there is some manufacturing, however, and the centres of a few hundred people commonly have one or more manufacturing plants which depend on raw materials secured from distant areas, as well as other plants which depend for raw materials on the local area.

Urban Development

The decided nucleation of the population of the region is clearly revealed in the ratio of population on farms and unincorporated villages (rural) to that in incorporated villages, towns and cities (urban). In 1931, of the total 2,572,000 inhabitants, the rural population was 31·1 per cent., the urban 68·9. This is the most intensely urbanised area of all Canada, a region of vigorous cities, nearly all with a steady growth.[5]

The street plans are dominantly a combination of shore-line and rectangular patterns. This generalisation holds for interior as well as for lake-shore cities, as the interior centres are commonly astride small streams to which the early streets were adjusted. The residential areas are predominantly made up of single houses of brick or stone. Industrial plants are found in the residential areas, in the commercial core, and on the margins—a dispersion understood, in the main, in terms of the wide diversity of industry, the presence of industries not considered nuisances, the large use of electrical power, and the unplanned evolution of the cities. The common absence of foreign quarters, the predominance of electrical power and of "light" industries, and the slow, steady growth of

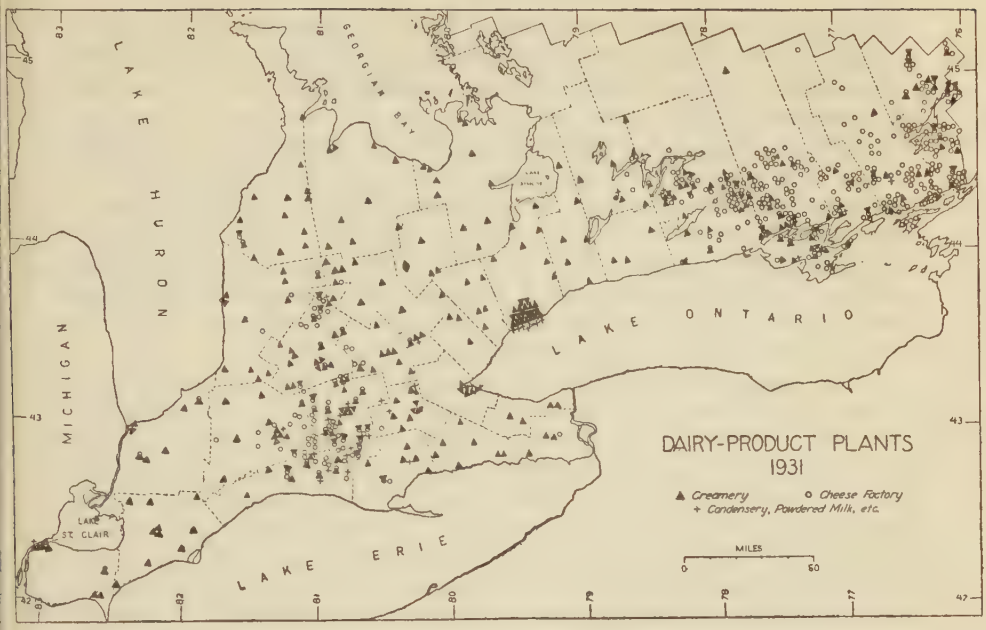

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
DAIRY-PRODUCT PLANTS
1931
▲ Creamery
○ Cheese Factory
+ Condensery, Powdered Milk, etc.
MILES
0
50

FIG. 10.

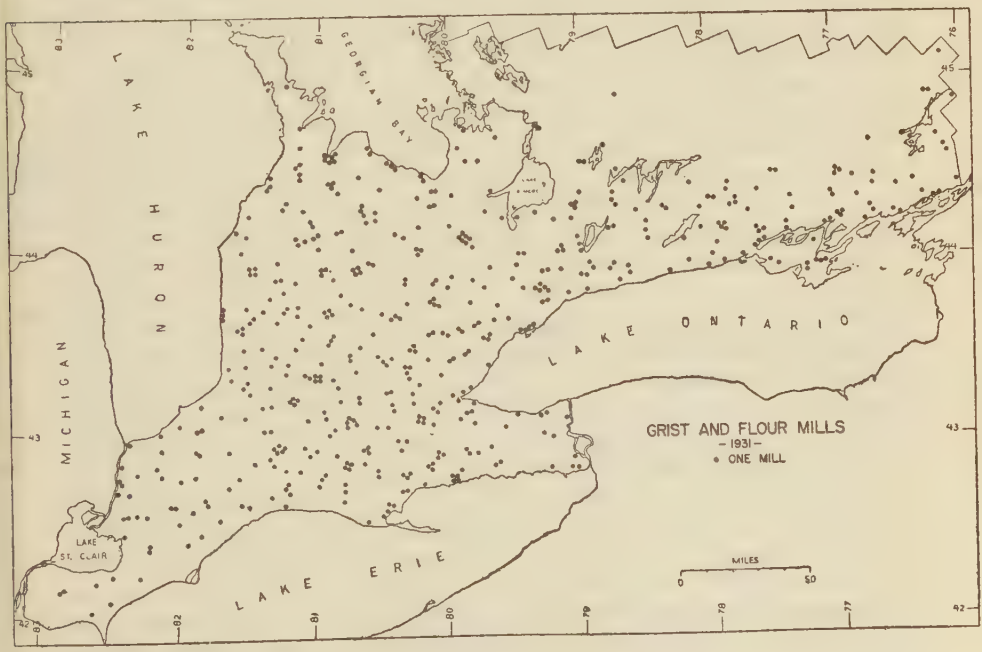

LAKE HURON
GEORGIAN BAY
MICHIGAN
LAKE ONTARIO
LAKE ERIE
LAKE ST. CLAIR
GRIST AND FLOUR MILLS
- 1931 -
• ONE MILL
MILES
0
50

FIG. 11.

these cities are factors accounting in large part for the tone of stability and well-being which characterises nearly all of them. The wealth of old Ontario lies, in the main, in these industrial-commercial centres.

Commercially, the relation of urban folk to rural was originally one of intimate interdependence of the urban centres and the immediately surrounding rural areas; industrially, the same relationship existed at first. Both relations have changed as sources of raw materials and markets have expanded. The urban centres, once almost abjectly dependent on the surrounding rural areas, have come to dominate the region, and their functions have become inter-regional and international in scope.

The region as a whole is one of light, diversified manufactures. Indeed, such centres as Peterborough, Orillia and Owen Sound constitute the most northern outposts, in this longitude, of the diversified manufactures of the Great Lakes region. Diversity has been favoured by the early development of manufacturing to meet diverse local needs, by the great variety of raw materials secured from the Peninsula and from the Shield lying to the north, and by the stimulus to new lines experienced during the World War, when European manufactured goods were secured with difficulty. Lying in the "acute fuel zone" of Canada, heavy iron and steel industries are not advantageously located here. Dairy product plants are the most widely distributed, closely seconded by flour and grist mills, the latter reflecting the antecedent Wheat Period and the continuance of grain production. The wide distribution of grist mills at hydraulic sites is an indication at once of earlier conditions and of the conservatism of the region. Wood-products plants, particularly furniture, characterise nearly the whole region. Plants making paper and small wooden articles now draw on the Shield for raw materials; and the furniture industry, with its local materials largely exhausted and its trade activities centring more and more in Toronto, is unquestionably in a critical condition. That the economic depression of the 1930's may bring a drastic redistribution in this industry is quite probable. Woollen mills, likewise a heritage of the days of local self-sufficiency and hydraulic plants, have made the transition to hydro-electric power and extra-regional raw materials. The larger centres resemble other principal cities in the Great Lakes region in the wide variety of manufactures, which include clothing, electrical apparatus, printing and publishing, and slaughtering and meat packing.

Outstanding in its connection with the industrial life of the Peninsula is the municipally-owned hydro-electric system (Fig. 12). A great super-power system, relying mainly on Niagara Falls and the water-power resources of the Laurentian border, it has unquestionably stimulated industry and favoured its dispersion, thus compensating somewhat for the meagre resources of the Peninsula in petroleum and natural gas. This power system, the embodiment

of the latest advances in hydro-electric technology, is oddly in contrast to the decaying but functioning hydraulic plants commonly found in each of the older population centres. The " Hydro " system covers the entire Peninsula, but the intensity of development, like the intensity and diversity of manufactures, serves to set the more southern portion apart from the rest.

Although many similar industrial features characterise the whole region, it is clearly divisible into two parts on the basis of diversity and intensity of industrialisation. The " constellation of cities with elaborate transconnections that give an urban culture pattern to the whole area " lies in the south-central part of the Peninsula.

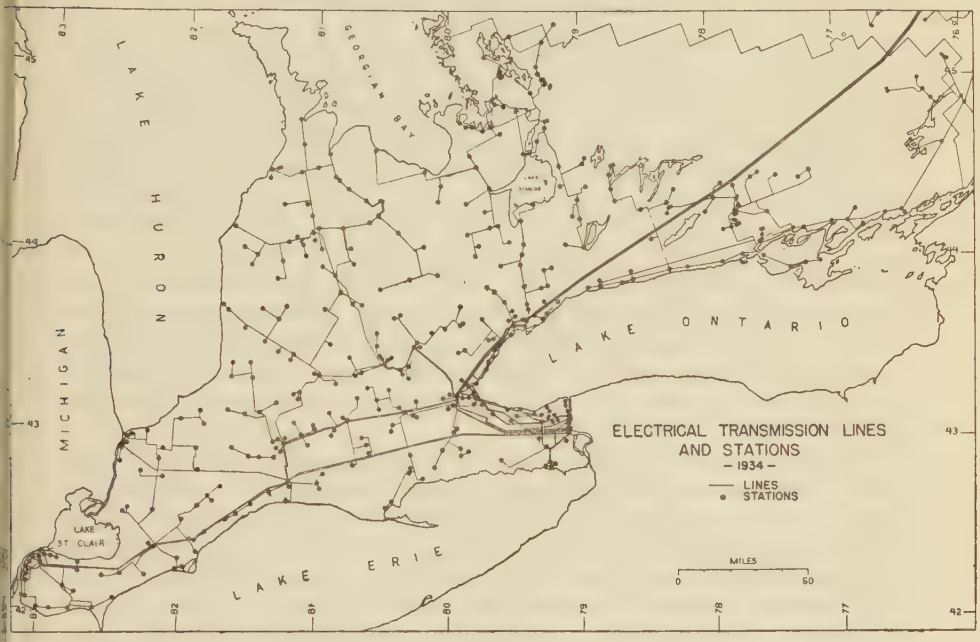


Fig. 12.

This area, which is indeed the cultural heart of the region, lies south of a line running from Oshawa westward to Waterloo, thence south-westward to London, and westward to Sarnia. It may very properly be included, as De Geer and Hartshorne have indicated, in the American Manufacturing Belt. Practically every major phase of industry, from automobiles to textiles, is characteristic of this industrial region.

Unifying Influence of Political Factors

Much of the industrial individuality of the Peninsula is due to its control by one province and one nation. Travel along the provincial and national boundaries clearly reveals that manu-

facturing is more characteristic of the small centres in Ontario than of those in Quebec, and that the national barriers between the Peninsula and the United States are responsible for decided contrasts between opposite sides of the international boundary, as along the Detroit and Niagara rivers. In Ontario the tempo of urban life is slower than in the eastern United States, but faster than in Quebec. Other consequences of unified political control have been expressed or implied, such as the hydro-electric system and the survey grill which more or less rigidly set the frame for land occupation.

Extra-Regional Relations

Peninsular Ontario functions in remarkably unified fashion in the national economy. Here is one of the principal dairy and industrial areas of the nation, in strong contrast, for example, to the Prairie Provinces with their dependence on grain production.[6] Rail-rate adjustments have aided that regional specialisation and have conserved the gains, thus furnishing a kind of regional insurance. So far as intimate inter-regional connections are concerned, the Peninsula is most closely related to the Shield, a vast portion of which lies in Ontario. The Shield, in turn, has had its natural resources developed in large measure through the initiative of the occupants of the Peninsula. Both regions have shared in a large tourist trade, and, through tax payments to the provincial government, each has tended in critical times to counterbalance the shortcomings of the other.

The location of the Peninsula, its economy, and its place in the British Commonwealth of Nations make it particularly sensitive to foreign conditions, a sensitiveness in strong contrast to near-by parts of the United States. The Peninsula is bombarded by influences from both Britain and the United States. The spread of capital and matured industrial techniques from the United States to the Peninsula, the interchange of populations, the intimate trade relations, the necessity for competing with American conditions (as in rail-rate making)—a host of such stresses originating in the United States bring noteworthy reactions in southern Ontario. The influence of Peninsular politics on adjacent parts of the United States is certainly far less productive of geographical changes. Great Britain, too, has contributed capital and managerial ability, influences the trade policies of Ontario, furnishes a principal market, and creates, with other members of the Empire, a politico-economic system within which the Peninsula must fit. This modern descendant of Upper Canada continues to look toward the British Isles.

Routes of Trade and Travel

The transportation facilities of the Peninsula constitute additional elements of uniformity, and also bind the various sub-regions into a

thoroughly integrated organism. The region is tributary in all its parts to near-by lake ports, and has reacted to every major change in lake transportation. The railroad net began as a series of co-operating and competing lines, both longitudinal and transverse with respect to the major axis of the Peninsula, and, as noted earlier, the cheapening effect of water transportation on freight rates has been blanketed over the entire region. The Peninsula is covered with a close rail net, which gives way to a coarser pattern at the Laurentian border (Fig. 3). The rail system has reached maturity, and a slight retrogression has set in locally. Having passed through a waterway-turnpike stage, and a railway stage, the whole area is now in the motor-transport stage of development—like the Lake States in that particular, but somewhat unlike the St. Lawrence Valley. The parallelogrammic net of all-weather roads covers the entire region except its immediate margin on the north. As in the Lake States, an abundance of beach and glacial gravels has aided road building. Over these waterways, railways and highways moves a volume of trade unequalled elsewhere in the Dominion. The Peninsula is the best selling and buying area in all of Canada.

The Toronto Metropolitan Area and The Peninsula

A certain uniformity of features and an outstanding element of organic unity are also provided by the presence of one dominant urban centre—Toronto. The Peninsula is the principal reason for the existence and development of Toronto, and makes up the core of its metropolitan area. To the west, the vast, sparsely settled stretches of the Shield form a broad trade divide between the Winnipeg and Toronto metropolitan regions ; to the east, the divide between the Toronto and Montreal regions lies in the vicinity of Kingston, at the eastern tip of the Peninsula. The trade area in which Toronto exerts a dominant influence thus consists of the Peninsula and a large block of the Laurentian Shield, but the Peninsula is obviously the area on which the prosperity of Toronto mainly depends. Although Toronto shares in manufacturing with dozens of centres, and in wholesaling with Windsor, London, Kitchener, Brantford and Hamilton, there is a definite trend toward the concentration of these functions in Toronto, now that all parts of the Peninsula can be easily reached by truck within a day's journey. From about 1880 to the present, the urban functions of the Peninsula have been concentrating in Toronto. The commercial, industrial and political prominence of Toronto serves to emphasise the rôle of the Peninsula as one of the primary regional divisions of the Dominion of Canada.

NOTES AND REFERENCES

[1] Defined, for our purpose, as including that part of Ontario south of the Laurentian Shield. The problem here discussed involved analysis of census data for townships and counties for 1931, 1921 and earlier years ; library study at the University of Wisconsin,

University of Toronto, and University of Western Ontario; and road-line traverses which formed a close-meshed net over the entire area. The traverses were made in the summers of 1931 and 1932, and the winter and spring of 1935. The problem required the checking of current ideas about the region as well as the gathering of new data. Only the broader conclusions are here presented. The field work was supported by the National Research Council and the University of Wisconsin.

[2] L. C. A. and C. M. Knowles, *The Economic Development of the British Overseas Empire*, vol. ii, 1930, pp. 212-213.

[3] For isorithmic maps showing primary land uses, see J. R. Whitaker, "Agricultural Gradients in Southern Ontario," *Economic Geography*, vol. 14, 1938, pp. 109-120. Figures 1 and 4, both of which appeared in that article, have been reproduced through the courtesy of *Economic Geography*.

[4] Richard Hartshorne and Samuel Dicken, "A Classification of the Agricultural Regions of Europe and North America on a Uniform Statistical Basis," *Annals Assn. Amer. Geog.*, vol. 25, 1935, pp. 99-120.

[5] J. R. Whitaker, "Regional Contrasts in the Growth of Canadian Cities," *Scottish Geographical Magazine*, vol. 53, 1937, pp. 378-379.

[6] The other leading industrial and dairy region is the St. Lawrence Lowland. The Peninsula and the St. Lawrence Lowland are treated together in J. R. Whitaker, "The St. Lawrence Lowland: Industrial Heart of Canada," *Journal of Geography*, vol. 33, 1934, pp. 329-339.

PRESSURE OF POPULATION AND MISUSE OF LAND IN THE PUNJAB*

By R. Maclagan Gorrie, D.Sc., F.R.S.E., Indian Forest Service

Forest the Enemy of Early Settlers

The first effect of any migration to a new country or of any marked increase in population is a demand for cultivated land. The natural result is the destruction of whatever forest or jungle interferes with this purpose. Most primitive communities are founded upon some form of "shifting cultivation," by which the local forest growth is forced into man's service to yield a seed bed for his cereal crops. The accumulated plant reserves of perhaps centuries are capitalised by burning to provide manure for a very few years of farm crops, but as pressure of population and the introduction of industries force the nomad to settle down, the itinerant farmer finds less and less fresh jungle to destroy and must either eventually alter his farming methods or die when he has exterminated the last patch of forest. The agriculturalist, even in a sophisticated country, is notoriously conservative and loathes change, and his primitive counterpart in semi-tropic jungles is naturally even more averse to it. Thus it comes about that in almost every tropic and semi-tropic country an intense struggle is going on—a triangular contest between the peasant, the government and the forest, in which the forest is invariably the loser.

Impact of Civilisation upon Primitive Agriculturalists

Success or failure in surviving the impact of new conditions when a primitive country is developed and modernised depends

* A paper prepared for the International Congress of Geography at Amsterdam, July 1938, and here published by permission of the Congress.

upon the adjustability of the countryman. Although he crowds the labour camps of the mines and factories, and adopts the motor lorry as his favourite means of transport, his brother on the farm may not alter his wasteful methods of agriculture, and in the areas where European settlers have attempted one or other form of plantation crop, such as coffee, cocoa, rubber, etc., they have themselves been so wasteful of the soil that the local man may develop even worse habits by imitating them. Even without migratory Europeans, the natural increase in population is so great, once the bogeys of famine and pestilence have been subdued, that the land very rapidly becomes crowded. I propose to deal in some detail with this process as it is seen in British India.

Effect of Peace and Protection

Southern and Central India consist of a low plateau, of ancient geological formation and with low hills, still partly covered with forest and separated from the Himalayas by the flat and low-lying plains of the Ganges and the Punjab. To the north the Himalayas rise steeply from the plains and separate India from Tibet. The climate is sub-tropical in the plains, where the heat of summer is intense, but in the Himalayas it is more moderate and similar to European conditions. The rainfall varies from almost nothing in the desert tracts of Rajputana to over 100 inches in the outer Himalaya, and is profoundly affected by elevation and distance from the sea. Over half the annual rainfall takes place in July, August and September, during the summer monsoon ; the autumn is dry and in winter very little rain falls. Towards the north-west the rainfall decreases and the Punjab plains, formerly desert, are now irrigated by a network of canals supplied from the rivers of the Himalayas.

Throughout the greater part of India the population is predominantly Hindu : to this proportion of the people the cow is sacred, never to be destroyed even when old or diseased. As a result every village possesses enormous herds of cattle which it is far beyond the capacity of the country to support. No land is set aside for grass or fodder. As much of it as can produce cereal crops is cultivated, and the cattle graze in the waste and in the forests, the village herds usually being in charge of small boys and ranging many miles daily in search of food and water ; consequently they are ill-nourished and undersized. Only in the densely cultivated alluvial or irrigated lands are the animals stall-fed. The population throughout the cultivated tracts is dense, being as high as 1500 persons per square mile in the rice lands of the Ganges basin. The holdings are small, seldom more than three acres per family. At the death of a peasant his lands are divided amongst his sons, and the resulting fragmentation of holdings is probably greater throughout India than in any other country. The population of

the country is increasing at the rate of three millions a year, and if the present rate of increase continues India will soon have as many people as China.

Goats are universally kept and browse on the stunted bushes of village grazing grounds from which the grass has already been almost eradicated by sheer weight of numbers. In addition to the local livestock there are large migratory flocks of sheep and goats, particularly in the Himalayas, where they graze in summer on the high-lying alpine pastures and in winter in the scrub forests of the low foothills. Buffaloes are kept by nomadic graziers, particularly in the Himalayan foothills, and are only partially controlled by the stringency of the forest laws. Broad-leaved trees such as oak and olive are universally lopped for fodder, and except in forests closed for reproduction there is little opportunity for seedlings to become established.

The pressure on the forests of the population, both human and animal, is intense and is increasing. The more irregular the distribution of the rainfall and the more intense the summer heat and drought, the more difficult it is for vegetation to persist. As the grass dries up during the summer the animals browse on the bushes and herbs, thereby reducing the covering to an extent which exposes the soil to severe erosion as soon as the heavy rains of the succeeding monsoon break.

New Frontiers of Development

The Gangetic plain and the old centres of agriculture were already well populated before the British finally occupied northern India. The increased population has largely been absorbed by the development of entirely new irrigation colonies in the plains' areas of low rainfall previously used by a few nomadic graziers and camel men. There is, however, a less spectacular but none the less persistent pressure of human and animal populations upon the other lands where the more primitive folk still continue their destructive misuse of mountain land, and it is in such areas that the destruction of the remaining forest goes on apace.

Destruction of Hill Forests

To appreciate the important part played by forest conservancy in the new prosperity of the Punjab, it is necessary to realise that half of this province is a continuation of the desert which stretches unbroken to the eastern shores of the Mediterranean. The Punjab plains are rendered cultivable only through the agency of great irrigation schemes, the total irrigated area being now in the neighbourhood of 55,000 square miles. The outer slopes of the Himalayas do, indeed, come under the influence of the monsoon rainfall, but in the Western Punjab the monsoon consists of infrequent but intensely heavy bursts of rain occurring after long intervals. Under

these conditions it is obvious that once the vegetation has disappeared, owing to misuse by grazing, fire or clearing for the plough, it can only be replaced with extreme difficulty. It is also obvious that the presence or absence of vegetation on the hillsides must have a profound hydrological effect on stream-flow. That these low hills have been consistently over-grazed for many decades is unquestionable. In the Siwalik hill tracts of Hoshiarpur district the average grazing per head of cattle is only about 2·5 acres—if goats and sheep are included, only about 1 acre—and this figure is probably representative of conditions throughout the greater part of the low hills. This is an absurdly high figure as compared with what is considered a normal grazing incidence in Europe or America.

The gradual deterioration of grazing and the increase in flocks having compelled the herdsman to find other means of feeding his cattle, broad-leaved forest has been lopped practically to extinction. The fine oak and chestnut forests on the Murree hills and the Hazara Galies have been all but exterminated within the last thirty years. The destruction of tree-growth reacts unfavourably on the grazing capacity in two ways ; firstly, deprived of shade, the quality of the grass on hot slopes deteriorates ; secondly, erosion, which results from the removal of the vegetable covering, causes a direct increase in the grazing incidence in the remaining plant-covered areas. Thus a vicious circle is established, as a result of which floods, desiccation and destruction of vegetation have increased appreciably.

Pressure on Land due to Misuse of Land

The average figure of population density is of very little use in indicating where control is required, because wasteful practices may be either intensive or extensive. A population of 50 per square mile with a heavy incidence of livestock and inferior cultivation, particularly if it is on steep slopes without any efficient terracing, may be much more wasteful than 1000 per square mile with well-terraced fields, compost manuring, and stall-fed cattle.

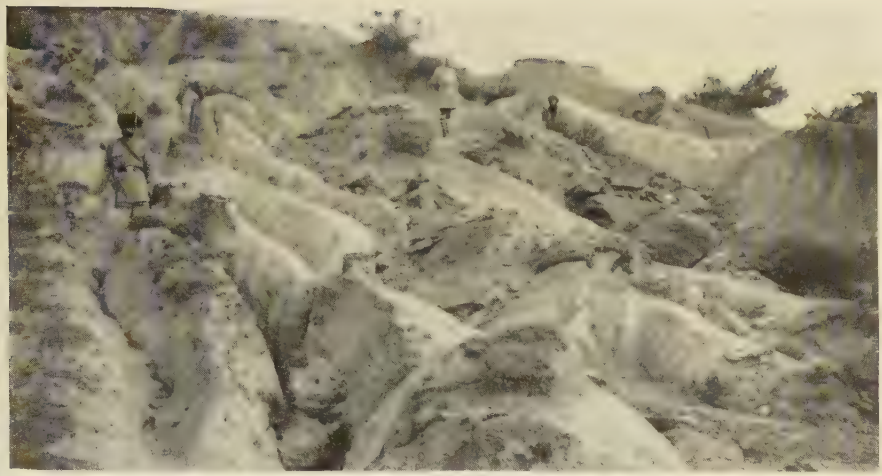
Trapnell and Clothier's *Ecological Survey of North-west Rhodesia* correlates the main climatic and soil variations with indigenous agricultural practices and advises improvement on rational lines. Changes in agricultural tradition through copying European introduced customs have complicated the regime, and increase in population has also thrown out native systems by increasing the drain on land for saleable and food crops. There are thus two sets of problems—those relating to the readjustment of natural systems to the increase in population, and those caused by changes in the old system through contacts and changes in markets. To quote from this report : " The systems of cultivation in Northern Rhodesia are those of a population naturally distributed in densities varying

from 1·5 to 15 or at most 20 to the square mile according as to the potentialities of the soil, practising shifting cultivation or employing a long bush fallow, with mixed cropping in gardens which are normally of a size adequate for domestic purposes and no larger. A distinct set of problems, at present arising chiefly on Upper Valley soils but extending to the Plateaux, is created by concentrations of the population in densities of 20 to the square mile and over in the vicinity of markets, by the increase of ploughing for a commercial maize crop and by the further confinement of the population in reserves. Mixed cropping and the customary rotations are being gradually abandoned in the large maize cultivations, although the mixed kaffir corn food garden is still retained. Shifting cultivation with its long rest period gives place to a shorter fallow period, but frequent shifts remain necessary owing to the depletion of the soil. In some Reserves a land shortage is arising, aggravated by the number of cattle owned. The density of stocking in certain of these reserve areas is higher than that of a European ranch, without allowance for the fact that the land is at the same time under cultivation. Fertile thorn country has been reduced by generations of cultivation and grazing to poor shrub-grassland, showing signs of soil deterioration and sheet erosion. At the same time increase in the acreage of commercial crops leads to disruption of the village into small family units and the formation of scattered peasant farms, equipped with ploughs, cultivators, occasional planters and other modern implements whose use is inadequately understood. The misguided ploughing and poor cultivation of large maize gardens adds to the erosion started by the tracks of draught oxen and sledges. The fact here emphasised is that contact with the European is destroying what is best in the native's traditional agriculture and providing in its place the defects of an alien system. The erosion that follows is not generally so serious that it cannot be checked, provided the spread of large ill-tended maize gardens through the country is prevented." This quotation is given at some length because it summarises admirably many of the points of similarity between African and Indian conditions.

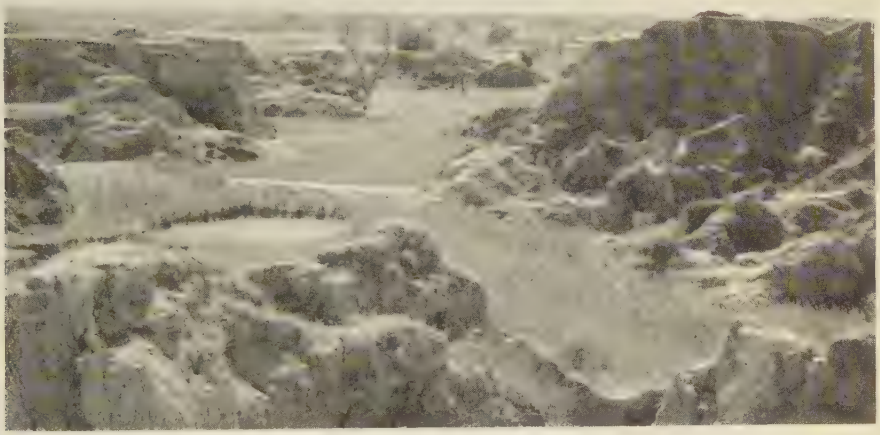
The more densely populated tracts, such as the Gangetic plain in Bengal, the North China alluvial plains, and parts of Java and Malaya, all maintain a dense population of as high as 1500 per square mile on an apparently permanent basis. This fact is entirely due to their good husbandry. As the forest is gradually expelled the cultivator must modify his primitive methods if he wishes his clan to persist. This is not so much the survival of the fittest as the survival of the most adaptable.

Effect of Poor Grazing on Cattle

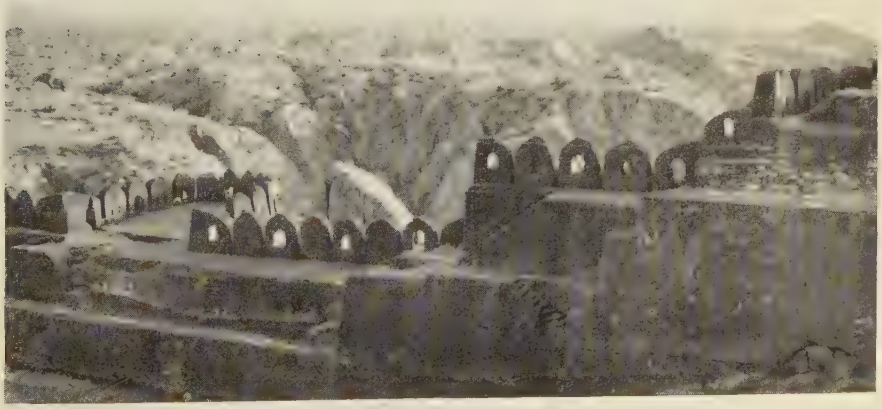
It is a striking fact that in districts such as Hissar (Punjab), the cattle industry is prosperous with a minimum of common grazing



A few years ago this was a sub-alpine meadow. Small relics of turf can still be seen. Hazara district, 11,000 feet.

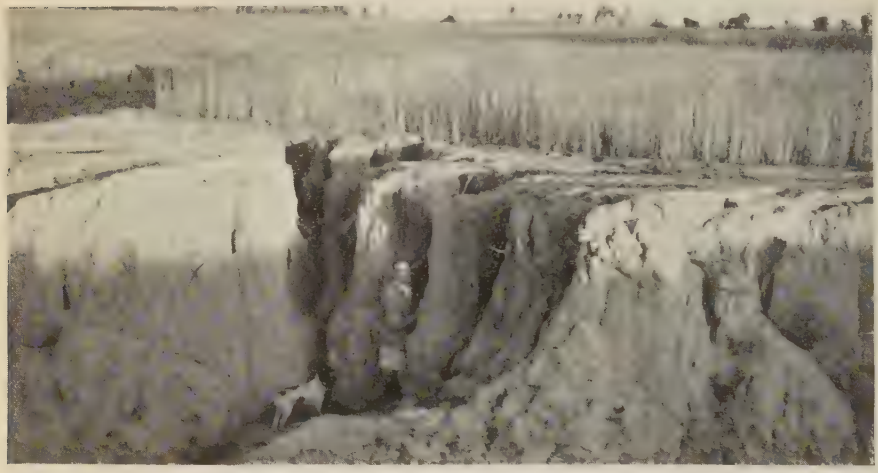


Bad lands between Rawalpindi and Gujarkhan. Eroded material is being trapped and used in a series of terraced fields.



Common grazing lands destroyed by gullies. Rohtas fort, Jhelum district.

The villager's own method of checking erosion · *watt bandi* (contour ridges) created of soil shifted in the *karah* (wickerwork or wooden scoop).



Badly maintained *watt bandi* give rise to finger gullies. The proper procedure here is to break down the vertical bank and keep it under some soil-binding crop. Between the Hoshiarpur Siwaliks and the main Himalayan foothills.

The mixed broadleaf scrub jungle of the Siwaliks and lower Himalayan foothills is a most efficient water catchment cover when it is afforded some protection from the attacks of man and livestock.

Some of the common land in every village should be reserved for growing fuel plantations, so that the cow-dung now used as fuel can go back to the land.

Alpine pasture above the forest belt cut to pieces by heavy grazing and sheet erosion.

The sequel to a heavy rainstorm beating unchecked on a hillside eroded as in the previous picture. Gujrat district.

The only blocks of forest remaining intact in the Murree hills are those demarcated as Government forests; even these are so seriously over-grazed as to interfere with their value as water catchment areas.

Pinus longifolia forest destroyed to make way for inefficient fields in the Murree hills, Rawalpindi district. Forests previously allotted to villages for their own use are rapidly disappearing in this way.

Each small group of badly terraced fields is the direct cause of a deep gully below. The group of fields in the upper half has recently been abandoned as there was no soil left to cultivate.

land and full use of stall-feeding, whereas the very worst type of cattle are seen in those areas such as the Kangra and Rawalpindi districts where large areas of free common grazing land are available and little or no stall-feeding is customary. Good specimens of the well-known breeds of cattle, such as Hissar and Dhanni, are bred where there is practically no common grazing ground left, or where individual animals are kept apart from the ordinary herd and stall-fed by the family to which they belong. Where the people have been forced to rely entirely upon stall-feeding they have naturally concentrated upon fewer and better animals. On the other hand, in many districts the people are so poor that they need all their land for growing food crops and cannot be expected to spare land for cultivated fodder crops. As the farm community alters towards the grazier type, the daily milk output per cow drops from an average of 16-to-20 lbs. of milk to as little as $\frac{1}{4}$ lb. We should therefore make the best use possible of all " waste " land (uncultivated) for the production of cut fodder rather than of grazing, and restrict the grazing to whatever part of the waste land is actually necessary to the cattle as an exercise ground.

Grazing Incidence

No accurate figures are available for Punjab conditions to show the number of acres per animal which will provide steady grazing without allowing of deterioration either in the animal itself or in the condition of the grazing ground. No Punjab grazing ground is equally productive throughout the year, and most types are entirely non-productive during the hot dry months of May and June. If stall-feeding, or a ration of prepared fodder such as stored grass or wheat straw or silage, were given to the herd during this bad season, the animals would keep in better condition and the grazing grounds would also be better able to recover from the drought.

Figures of average incidence for large areas do not show us the true situation. For instance, 12,000 acres of forest may have 4000 animals grazing in it, making an incidence of three acres per head, but if the entire livestock concentrates round one watering point and its neighbouring shady forest, this part of the forest will be seriously over-grazed though the rest is hardly used at all. In America salt blocks are put out in ungrazed areas to encourage the animals to go further into them and to use them more.

Deficiency Diseases of Men and Livestock

It is becoming recognised by authorities everywhere that a milk diet is of the utmost importance in raising the standard of human nutrition, but the quality as well as the quantity of the milk output deteriorates wherever the animals are not properly fed. Apart from grazing, the food resources for animals comprise (*a*) straw

and stubble from crops such as rice, wheat and sugar-cane ; (*b*) leguminous and other fodder crops ; (*c*) cut grass ; and (*d*) tree loppings. Rice straw is the mainstay in many districts but is not in itself a *maintenance ration*. Lander and Dharmani place the value of Kangra rice straw at well below this standard, which is the minimum digestible protein needed to keep a cow fit when not working ; it would not provide for a plough bullock at work, nor for a good milker. Wheat straw is somewhat better in food value, but the amount available is sufficient only for a short time after each harvest. The chief fodder crops are *juar* (*Sorghum durra*), and in irrigated tracts *berseem* (*Trifolium alexandrium*), *shaftal* (*T. resupinatum*), and lucerne ; again the amount of these fodder crops is in inverse proportion to the amount of wild grazing land available, and the poorer districts have such a hard struggle to find enough land for their own food crops that they cannot grow any fodder. This is a point which many animal husbandry enthusiasts have failed to grasp.

The value of cut grass is also rather low in the foothill areas, partly owing to the natural poorness of the grass crop from land which is heavily over-grazed for at least nine months in the year, partly owing to the method of harvesting the grass. At the time when hay ought to be made, in the months immediately following the monsoon, the cultivator is busy with his autumn ploughing, so that the cutting of grass is inevitably delayed until only the dry stalks of the crop are left. As it is not possible to alter the agricultural calendar, progress appears to lie along the lines of grass improvement and cultivation by contour ridging, and by any other means which will keep the grass green for a longer time. The possibilities for the improvement of wild grasslands along such lines are tremendous, but are so far practically untouched.

Reduction of Livestock

The primitive idea that livestock represents wealth is responsible for the keeping of far larger herds of male cattle than the milk and plough cattle requirements justify. Figures for Mandi State, for instance, show a total of 104,000 male cattle to 26,000 ploughs and 102,000 milk cows. Such animals are really a heavy burden, because they destroy the pastures and give nothing in return. Possibly the best justification for large herds is that they constitute the only source of manure for the fields, and this is a point which requires careful thought in preparing any scheme for the reduction of surplus herds. In the absence of forests, cow-dung is the chief fuel supply as well as the only manure. With a Hindu population any attempt to slaughter or otherwise dispose of surplus stock is likely to be resented, so that summary reduction is not a feasible proposition. This handicaps the Punjab very seriously as compared with Kenya, which has established a new industry through the

action of the Liebig Company in setting up a canning factory to dispose of similar unwanted cattle. As this is not feasible, the following methods of approach should be considered and applied so far as possible :—

1. Establish demonstration farms and fenced plots which will give practical illustrations of the benefits of lighter grazing.

2. Educate the rural population in the simpler essentials of animal husbandry.

3. Introduce the use of bloodless castration, in which the local forest guards and stockmen can easily be trained, and the separate herding of bulls, rams and buck goats.

4. Create village fuel plantations to provide a substitute for cow-dung as fuel.

5. Encourage the use of green manure crops (ploughing down leguminous and other herbaceous crops to increase the organic content of the soil in cultivation).

6. Develop the use of a compost manure in which use is made of all vegetable and organic waste matter. This produces a much larger volume of manure than is obtained by merely saving up the excrement of the animals. The only cost is that of labour.

7. Develop the use of the silage pit to produce cheap supplementary feed when grazing is poor. All other manufactured feed is much too dear to be a feasible proposition, but by saving all available green crops a valuable cheap feed may be obtained.

8. Stop common grazing by dividing the village common into plots allotted to families or groups, so that some individual responsibility may be created for checking over-grazing. The limiting factor for such a scheme is almost invariably the water supply, which can seldom be distributed throughout a series of small paddocks. The success of partition of *shamlat* (common grazing) appears to depend directly upon whether there is a real land-hunger which forces people to work hard on improving the land allotted to them.

Effect of Misuse of Land upon the Water Regime

The Punjab's main problem can be summarised as lack of soil in the hills and of water in the plains, for even in the irrigated tracts prosperity is restricted by the increasing shortage of water for *rabi* (winter) crops. These two may not at first sight appear identical, but a consideration of the water cycle will show them to be related. Air moisture drawn from the sea is dropped on the land as rain from clouds under given atmospheric conditions. Some portion of the falling rain is held by the ground surface and sinks in, while the rest runs off as surface drainage into the nearest stream and thence to a river and the sea.

The supply of water in wells and permanent springs depends directly upon the first of these two, because the underground water-table is fed and maintained by whatever water sinks through the soil.

The soil acts as a sponge in passing surface drainage down into the rock crevices below. Where there is no soil there can be no sponge action, and where the soil is a bare surface without plant cover—as in fallow fields—the sponge action is very slight, for the surface of the soil is caked into an impermeable crust off which the water flows as if from a cement or iron roof. The sponge action depends upon the amount of the plant cover, being best under canopied tree forest with a deep undisturbed layer of rotting leaves on the ground below. Even in prolonged and torrential rainfall the surface run-off from such forest is distributed over a long period and a large percentage of the arrested rain is passed underground. On the other hand if it has been much opened by lopping, fire, browsing, or very heavy fellings, or grazed until the floor is beaten into a hard cake of clay, the forest is no longer capable of dealing with rainfall, and much more runs off immediately as surface drainage. In the same way grassland, though not actually as effective as good forest in stopping rain, is a very good substitute, provided it is given a chance of building up a spongy soil and a good thick plant cover. But the more heavily it is trampled and the thinner it becomes through continuous grazing, the less efficient it must be in stopping floods and passing water underground.

Water Supply Requirements and the Dry Season Shortage

In American data, the ground under field crops is shown as yielding a heavier run-off than do their grazing grounds, but the reverse is the case in India. Even where terracing is not so good as it might be, a series of small terraced fields is more efficient in stopping surface run-off than is a corresponding area of heavily grazed land carrying only scattered bushes and poor grass on an uninterrupted slope. Run-off data collected by the Irrigation Branch from torrents of the Pabbi Range (Gujrat district, Punjab) show clearly that the peak flood of immediate surface run-off is much more serious from heavily grazed land and increases by recognisable stages of damage to the plant cover. Compared with the gentle run-off from a fully afforested area yielding 100 cusecs * per square mile, protected scrub jungle yields 600 cusecs ; the same kind of ground open to considerable grazing yields 1000 cusecs, while an area entirely open and badly denuded by constant heavy grazing, browsing, and lopping yields 1600 cusecs. In this last case the floods actually measured represent about 90 per cent. of the storm rain which falls in the area, showing how very seriously grazing and other misuse of the scrub jungle interferes with its function of water storage. Run-off of this latter type naturally exaggerates the intervening periods of drought, because the spring supplies and underground water-table both deteriorate.

Immense areas of the Punjab plains now depend upon perennial

* A "cusec" equals one cubic foot of water per second.

canal irrigation but are by no means sure of their winter water, and the progressive deterioration in the condition of the high hill and foothill catchment areas further endangers the position. The further development of irrigation is restricted to the pumping of well water by hydro-electric or animal power, and experience in the Jullundar *doab* indicates that the water-table there has already been so badly affected by disafforestation and the denudation of the Siwalik foothills that further pumping is likely to exhaust the available supply. In this respect the Punjab hills are not comparable with those of the United Provinces, where well irrigation is being extended successfully. The hydrological balance in the United Provinces is well established, with more frequent rains and generally speaking a better plant cover in the catchment areas than is found in the Punjab. A comparison of the Saharanpur Siwaliks immediately east of the Jumna and of the Ambala Siwaliks just west of it shows very clearly the cumulative effects of protection on the one hand and of denudation on the other. The hydrological balance in the Punjab *doabs* has already been upset by misuse of the catchment areas, so that the price now being paid is the steady but cumulative deterioration of well levels.

Industrial Water Needs

Even industrial activities are affected by alternating floods and droughts, economically because of the resulting poverty of the cultivator, and technically because of their dependence upon sustained water supplies for manufacturing processes and hydro-electric power. The greater the flood peak of uncontrolled run-off, the longer and more serious is the intervening water shortage, which shows as a " trough " or dip in a graphical illustration of the quantities available from any of the larger rivers.

The various irrigation projects have so far depended upon the free flow of a river, and so have escaped the serious problems of the silting of reservoirs which has spoiled the economic success of many water supply projects in other countries. Many of the great American projects have been seriously interfered with or entirely ruined by the rapid silting up of their reservoirs, and it is for this very reason that Punjab projects such as the Bakhra Dam have had to be delayed or discarded. The Uhl hydro-electric project also cannot reach its full planned development without making some provision for securing a better winter water supply, either by reafforestation of the catchment area or by constructing a dam. The other alternative is a separate and supplementary coal-burning plant on the plains. But whatever plan is adopted, the fact remains that an otherwise sound engineering plan is very severely handicapped by the shortage of winter water, a direct outcome of improvident and thoughtless denudation of the catchment area by primitive hill farming methods.

The value of the hill catchment areas assessed purely as water-catching basins already far exceeds the value of the local farming and grazing communities which they maintain, and with increased industrial and city development this difference will increase. In the case of the Uhl catchment, an area of 150 square miles yields to the Government an income of ½d. per acre in land revenue and grazing fees, and maintains a population of less than 30 per square mile in a state of dire poverty. The money invested in the Uhl project, however, amounts to Rs. 730 (£56) per acre of the catchment area, though nothing whatever out of this has so far been spent upon the catchment area itself and no action has been taken to replace the primitive cultivation with a better plant cover, which would guarantee a sustained winter flow. This illustration is quoted to show the fallacy of allowing a few primitive graziers to exercise their so-called " rights " of destructive exploitation of the natural plant cover at the expense of a very much larger community—in this case entailing as it does the future prosperity of the greater part of the Punjab, or at least of all those parts of it where electrification is being developed.

Possible Lines of Attack

Judging from Indian experience the best lines of approach in dealing with this menacing situation can be summarised as follows:—

(1) ploughland

The cultivator should be encouraged to improve his own land by contour ridging and terracing, maintaining field drains where such are required, and gully plugging to check deep erosion in and between the fields. Co-operative loans might help the cultivator to effect such improvements, or taxation be remitted in consideration of their having been made. The authorities can help also by making arrangements for the capture and use of road run-off, the restriction of cultivation on very steep gradients and the refusal of permission to break virgin ground on vulnerable slopes. They might also institute short courses of training in erosion control among the district civil staff. Special attention should be given to the suitability of the crops grown. A leguminous or grass crop might be found for sowing in fallow. The rotation of crops and strip cropping with a soil-building crop should be encouraged, as should the use of compost manuring and the cultivation of a green crop to be ploughed in. If possible a substitute should be found for cow-dung as fuel ; and there is room for improvement in the cultivation of wasteful crops such as the potato. Consolidation of holdings to facilitate the planning of the field lay-out, and the use of live hedge plants for properly aligned hedges would be additional aids.

(II) LIVESTOCK AND FODDER

The object here must be to make large and poor herds demonstrably uneconomic. This will lessen the pressure on grassland. The existing pasture resources should be conserved—by voluntary and rotational closures and legislation to extend their application, contour ridging and water catching, and the substitution of stall-feeding for grazing—and efforts should be made to supplement the natural resources by the cultivation of green fodder crops and silage, of emergency fodder crops such as the spineless prickly pear, and of fodder trees lopped in rotation. The palatability of the native grasses should be determined, their deficiencies supplemented by mineral salt "licks," their desirable qualities enhanced by plant breeding and their value demonstrated by the development of grass and hay markets. The community can help by providing for the partition of the common lands, their management by village committees and the improvement of the water supply for livestock by dams, tanks, wells, etc. The migratory movements of flocks should be controlled, and the numbers, especially of goats, reduced. This might be effected by means of a cattle or livestock tax, which would have the effect of encouraging a good type of milch or plough cattle while at the same time eliminating the useless scrub animals, and of favouring sheep in preference to goats. The quality of the remaining animals might be still further improved by the maintenance of stud animals and the segregation or castration of surplus males. Facilities for the humane killing and profitable marketing of the better type of beast and their hides should encourage their maintenance.

(III) AFFORESTATION AND OTHER WORKS

The utility of these measures must be evident, but cost is the limiting factor. The existing forest should be protected by control of grazing, and its condition improved by contour trenching and water catching, the closure of dangerous landslips and their vicinities, and the refusal of grants for fresh cultivation in village waste or scrub jungle. Its acreage should be extended by the reclamation of ravined land for fuel and fodder production, and of flat lands in torrent beds by stream training; and the demands made on it should be lessened by the establishment of village plantations for fuel, timber and fodder requirements, the rotation of lopping and the dissemination of fodder trees in grasslands. Shelter belts should be established where advisable. Special legislation may be necessary for the control of vitally important catchment areas. Finally, the village should be encouraged to regard itself as the unit for the organisation of forest improvement and protection schemes.

GEOGRAPHICAL NOTE

Report of the Land Utilisation Survey in Scotland.—Although since 1933 we have been fairly familiar with the coloured One-Inch Maps issued by the Land Utilisation Survey of Britain, we have been left hitherto to draw from them our own inferences. This the Survey is now obligingly about to rectify. Each sheet is to be accompanied as soon as finances permit by a quarto memoir illustrated with analytical maps and diagrams and edited by the Director of the Survey, Dr. Dudley Stamp. The first three Scottish counties to be made the subject of textual as well as of cartographical survey are Ayrshire, Moray and Nairn.

The authors of the individual surveys bring to the interpretation of their maps a minute and expert knowledge each of his own district such as must be denied in the nature of things to most of their readers. An early objection raised to the mapping of the crops was that the work was no more than a duplication of statistics already collected as a matter of routine by the Government. Graphically the finished maps answered that objection by showing not the quantity only, but the location also, of grass and of grain. Now the Reports come forward to point out, not only the geographical controls behind the distribution of our farming regions, which can be read in the majority of cases from the map, but the historical and economic reasons also governing those distributions. To any one with access to such generally meagre records as we possess of the past in this respect, it emerges very clearly that on the best land, as on the poorest, the utilisation has been persistently what it is. It is a fair inference that any attempt to discourage the growing of wheat where wheat has always been grown, or to bring into cultivation land that has always been waste, will be ill advised in the interests of even the most rabid nationalism. It is not in such regions of stability of utilisation, but rather on land of intermediate quality, that changes have taken place and experiments have been made resulting sometimes in its improvement. Only in our own generation has the stability of utilisation hallowed by centuries suffered disrespect at the hands of Town Planning Councils and the builder. The Survey, scanning its own maps before contemplating proposals for housing schemes, reservoirs and the zoning of industry, has not hesitated fearlessly to denounce the misappropriation of some of our best agricultural land for sterilisation by concrete. It should be our care, as it has for centuries been the care of agricultural communities without infinite possibilities of expansion at their disposal, to plant not our farms but our fields on the richest, sunniest and best drained soil. Formerly the regional " planner," if we may dignify him by the implication, had the excuse that except occasionally and on quite a local scale he had no information as to the whereabouts of the richest soils. Now, thanks to the Land Utilisation Survey, ignorance is a confession of unintelligence. The findings of the Survey are to be embodied in its Reports, covering England, Wales and Scotland county by county, and the whole vast work will in time make available for reference a twentieth-century national stocktaking not altogether uncomparable with the Normans' Domesday Book.

The International Congress of Geography at Amsterdam, July 1938, will be fully reported in the next issue.

GEOGRAPHY AT THE BRITISH ASSOCIATION

The Annual Meeting of the British Association for the Advancement of Science was held this year in Cambridge, where proceedings in Section E (Geography) were opened by the President on August 18th. As Professor Griffith Taylor spoke at some length on the subject of *Correlations and Culture : a study in technique*, we regret that his Address cannot be published in full in this *Magazine*; we hope, however, to print an abridged version in November. The Address was distinguished for its breadth both of subject and treatment, and it is noteworthy that a number of subsequent speakers related their contributions to the geographical concepts expressed by the President. The same day a Symposium on the geographical aspects of the Scientific Delegation to India was contributed by Mr. J. McFarlane and Professors A. G. Ogilvie, H. J. Fleure and C. B. Fawcett, and was later illustrated by the coloured and uncoloured films of Mr. R. H. Kinvig.

An extensive lecture programme has been based on the British Graham Land Expedition under the leadership of Mr. John Rymill (1934-37), and Mr. G. C. L. Bertram attempted the description of only a small part of its work of discovery in *King George VI Sound in the Antarctic*. This is the expedition which disproved the existence of an Antarctic Archipelago surmised to exist by the airman Sir Hubert Wilkins on the site of the Graham Land Peninsula. King George VI Sound lies to the west of Graham Land and is remarkable in containing the only known area of confined shelf-ice. Professor Debenham then spoke on *The Geographical Laboratory*, of which the new Department of Geography at Cambridge, in which the meetings of Section E were held, is itself the illustration.

The next four papers were of local interest and valuable by way of preparation for the excursions on Saturday to the coast at Hunstanton and on Sunday to the Fens. Miss J. B. Mitchell's *Suffolk Agriculture in the Middle Ages* and Mr. F. Walker's *East Anglia and the Civil War* were of historical interest. *The physiography of North-west Norfolk*, by the local secretary, Mr. J. A. Steers, and *The Draining of the Fens*, by Dr. H. C. Darby, were competent treatments both directly relative to these excursions.

A well constructed paper by Mr. W. V. Lewis on *Cirque formation in Iceland* was the first to be delivered on Monday. A case for the extension of the plucking and shattering action, inferred in the original Willard Johnson theory of cirque formation, from the area immediately at the foot of the *bergschrund* to include that of the head wall above it as well as of the surfaces hitherto thought to have been protected by ice accretion, was well substantiated by numerous beautiful and significant coloured slides. The rest of the day was devoted to a Symposium on *English ports and estuaries in their geographical setting*, to which contributions were made by Mr. F. H. W. Green (Southampton), Mr. A. E. Stephens (Plymouth), Mr. G. Hayes (the Mersey), Mr. W. G. East (the Humber) and Mr. O. Borer (the Wash). These speakers concerned themselves primarily with physical factors of which the human importance was unemphasised, and what appeared to be an opportunity for correlation and generalisation was not developed.

By contrast the Symposium which followed on *Some aspects of the regional concept* showed much community of interest divergently

approached. The official speakers were Dr. S. W. Wooldridge, Dr. R. E. Dickinson, Dr. R. O. Buchanan, Miss H. G. Wanklyn and Professor C. Daryll Forde. A spirited open discussion ensued, and the impression throughout was that of men speaking more or less extempore on topics made familiar by private thought. It is hoped to give permanence in print to the facts of this discussion, which need not be repeated here. The afternoon brought a thoughtful statistical study of one aspect of the Census Tables by Dr. E. H. Selwood, who has worked out the proportions of persons gainfully employed in various trades and crafts for typical urban agglomerated communities in this country, thus narrowing considerably the implication of his title, *The classification of communities by occupations*. A lively paper to some extent related to this same subject was Mr. E. W. Gilbert's analysis of *The growth of inland and seaside health resorts*, which, although some ten per cent. of our towns with a population of over fifty thousand can be so classified, have not received hitherto the attention they merit as features of cultural geography.

The last papers were that of Dr. Vaughan Cornish on *The Sidmouth coast and the preservation of its scenery*, and Miss M. F. Davies' *Irrigation in the Canterbury Plains, New Zealand*. Dr. Cornish owns farmland in the vicinity of Sidmouth, and quoted from his own experience as to the value of co-operation between landowners and local authorities in the interests of our fast disappearing cliff scenery. Miss Davies described by slides and films a method of irrigation which has been found specially suited to the cultivation of porous soils in New Zealand. The Section Dinner was exceptionally well attended at the New Dorothy Restaurant on August 22nd.

REVIEWS OF BOOKS

EUROPE

Edinburgh. By Sacheverell Sitwell and Francis Bamford. London : Faber and Faber Ltd., 1938. *Price* 12*s*. 6*d*.

While adding no new information to the history of Edinburgh, this volume embodies many of the unfounded stories which modern and accessible research has disproved. A very few instances may be quoted.

The " black bull's head " of the James II story, converted into a " boar's head," has been disproved by that competent historian, Moir Bryce. The martyr Patrick Hamilton suffered at St. Andrews. Inchmaholme is not a stronghold but an islet in the Lake of Menteith. The statement that if the Casket Letters were not genuine the forger must have been a brilliant one ignores the fact that we have not the originals by which to judge. (That is quite apart from a later ungenerous suggestion that Mary Fleming might have been implicated in the forgery.) The Covenant of James VI, the " King's Covenant," is confused with the National Covenant, and the exploded story of the signing of the latter on a tombstone at Greyfriars is offered for belief. Another discredited story, that of the presence of the Marquis of Argyle and his daughter on the balcony of Moray House, when the Marquis of Montrose was brought captive to Edinburgh, also makes its appearance, with the added blunder that the episode is placed on the day of Montrose's execution, during his short journey from the Tolbooth to the scaffold. Moray House does not lie on that route.

Much more might be said of the historical part, of the inaccuracy of the

exposition of policies and weighing of personalities. But the culminating point is reached in the account of the period from 1638 to 1689, when the troubles attending the Covenants are summed up as "for a mere scrap of paper," a judgement as cheap as it is inadequate, by persons who can have neither sympathy with nor understanding of Scottish history.

The attention paid to the city itself, little in comparison with that given to national history and unaccountably so in view of the title, is equally inaccurate and misleading. Again a very few samples must suffice. The statements about the town of 1554 are worthless; houses were not "embryo sky-scrapers," unless the usual two storeys and an attic be so. The derivation of the magistrate's lamps from a convoy with torches for the provost is absurd. The writers also confuse Edinburgh with the Canongate, separate burghs until 1856. It may be excusable to refer to Parliament Close nearly fifty years before it existed, or to be confused as to the subdivisions of St. Giles, but the story of King James and the riot is on record and ought to have been rendered accurately. A footnote to the allusion to the building of the Canongate church contains four mis-statements in ten lines: Moodie's legacy was not for repair of the Castlehill church destroyed by Cromwell; work on the church ceased in 1648 for lack of funds; Moodie's legacy for a *new* church is of 1649; Cromwell's occupation of the city was in 1650, when his men stopped before "the actual destruction" of any church; and lastly the money for the restoration of the Chapel Royal was left by the Earl of Leven and Melville, not the Earl of Crawford. The less said about the '45 the better—and we are weary of hearing that Prince Charlie slept where he did not, in the Palace of Holyroodhouse.

About the government of the city there is equal ignorance; the illustrations are sprinkled at random, nor is any reference made to them. C. B. B. W.

Companion to Tweed. By GEORGE BURNETT. London: Methuen and Co. Ltd., 1938. *Price* 8*s.* 6*d.*

Mr. Burnett is a devout lover of his dear Tweed and dedicates this Companion to her. It is a thoroughly satisfying book, written in a pleasant, easy and attractive style. So easy is it to read that one forgets that, apart from the actual physical effort involved in following the river to the sea and exploring the tributary streams, a great deal of research has gone to its making. But the result is admirable and the book deserves to be widely read. To those who already know and love the Tweed, it will have something new to say; and to the stranger who is making his first acquaintance with the district it will be an invaluable guide.

The Tweed in its journey from the source at Tweedshaws—it is not easy to fix on a particular well as the source—is never a foiled circuitous wanderer, but moves with purpose and certainty through the loveliest of scenery, and its silver streams have witnessed many strange incidents in Scottish history. Indeed, to know the history of Tweedside and the Border Burghs and the Border families is to know a very considerable part of the history of Scotland. For there were great families here—the Comyns, the Morton-Douglases and the Black Douglases, the Scotts of Harden and Buccleuch, and the Kers; and there were many turbulent clans, such as the Tweedies and the Veitchs.

Mr. Burnett dwells, naturally enough, on the districts associated with the Border Ballads and with Sir Walter Scott and Hogg. And no doubt the Tweed at Abbotsford and Ashiestiel is beautiful, and lone St. Mary's and the valleys of Ettrick and Yarrow will always charm and delight. But it is not there that the Tweed is at its proudest, but rather in the uplands of Peeblesshire and where it sweeps round the Castle of Neidpath.

Mr. Burnett deals shortly but adequately with the Burghs and gives an account of the various March and Common Ridings. These will always be attractive, but to many these celebrations and local festivities are becoming a little tiresome. Local patriotism is a fine thing and deserves every encouragement, but local self-conscious rivalry is not so attractive. Nor does Mr. Burnett forget

to praise famous men ; although, as he passes through Peebles, he curiously omits to remind us of the wonderful life story of the Chambers brothers.

The book lacks a map, which is a pity. To select the illustrations, where there is so much beauty, must have been very difficult. Some are excellent, but there are strange omissions. J. W. B.

The Isle of Foula. By the late Professor Ian B. Stoughton Holbourn. Lerwick : Johnson and Grieg, 1938. *Price* 7*s.* 6*d.*

This interesting volume consists of a series of articles on Britain's loneliest inhabited isle, together with a memoir of the author by his wife. There are seven hundred and eighty-seven islands in Scotland, and of these the two most remote are St. Kilda and Foula. The former is thirty-nine miles from the nearest land and sixty from a port, while the latter is fourteen miles from the nearest land and twenty from a port. Much has been written about St. Kilda, with its great cliffs of 1000 to 1300 feet, while comparatively little has been written about Foula, with its great sandstone cliff of 1200 feet. The paucity of information about Foula makes this volume doubly welcome.

Professor Holbourn was the laird of Foula for thirty-five years, and during the whole of that time he spent, with his family, by far the greater part of his leisure on Foula. The island is three-and-a-half miles long and two-and-a-half wide, with an area of over 4000 acres. It is, like St. Kilda, noted for its fine cliffs, which according to Professor Heddle stand " unrivalled in the British Isles." In a lengthy chapter the author claims that this island is no less than the Thule of the Ancients. The population was 240 at the beginning of this century but is now only about half that number. The people live by crofting, fishing and knitting. We are told the inhabitants are a remarkably intelligent and skilful people, building their own boats and houses, and are excellent seamen. The early history of the island under the Danish dynasty is brought under review. The volume of 256 pages is well printed and beautifully illustrated, showing both the natural features and domestic life. A foreword is contributed by Michael Powell, author and director of " The Edge of the World."

J. M.

Modern England. By Cicely Hamilton. London : J. M. Dent and Sons Ltd., 1938. *Price* 7*s.* 6*d.*

The purpose in adding *Modern England* to the " Modern Europe " series is not that of comparison between the old and the new but is rather to provide a platform for a series of discussions on assorted important topics, to each of which a chapter is assigned. These include the supposed alarm at the predicted decline in the population, some things we do as well as anyone but do not advertise, the ugliness of modern buildings as compared with those erected over a century ago, old and new industries in Cornwall, the change that has made air-raid precautions necessary, bogies and pacifists, modern dress, the passing of the large country house, unemployment, recreations, the disadvantages inherent in the size of London, propaganda for the young, the drift of labour to the South, and a few odds and ends of comment on sundry changes in manners and customs. All the topics are given a straightforward and reassuring treatment, and there are a number of apt illustrations. W. O. L.

In England Still. By Phyllis Crawford. London : J. W. Arrowsmith Ltd., 1938. *Price* 8*s.* 6*d.*

So great has been the author's physical exertion, not to mention her mental energy, in collecting first-hand evidence of living traditions of all sorts, from the innumerable counties, towns and villages where folk-memory persists in commemorating events long past, that the reader's task in rightly assessing the value of such work has been greatly facilitated. The book affords an almost endless amount of truthful information which is edifying, amusing, and in not a few instances ridiculous. One is forced to wonder why in this realistic age we

perpetuate so many senseless practices, and more particularly those to which some flavour of religious observance attaches. Full-page illustrations add, in many instances, to the graphic descriptions so well and so interestingly recorded. A profitable hour may be spent with this book in studying these ancient rites, so numerously celebrated in all parts of England. A. E. M.

The Heart of Hertfordshire. By Owen Hamilton. London : Robert Hale Ltd., 1938. *Price* 5*s.*

The first impression the reader is likely to gain from this title will be that here is a book about Hertfordshire. For all that it contains, however, of topographical detail, the book might be descriptive of any English county ; for the author's object in writing it was not to describe a particular countryside and its associations, but to seek some quiet and picturesque spot where he could exercise his muse.

Mr. Hamilton has, by his past works, gained for himself a reputation as a *littérateur* of no mean order ; and much that he has written in this book will be read with the same pleasure and profit as his former works have evoked. But his wisdom has somewhat exceeded the bounds of discretion in such a passage as the following : " It has always intrigued me how such vivid artists as Christ, Keats, Chopin might have ended their days, save from the mishaps of crucifixion and consumption. Very different records would no doubt have resulted from what most have supposed. All three men were, each in his own way, confirmed idealists, and it is the future of idealists, especially, that should intrigue. With them what room for conjecture ! One burns to discover their reactions at the precise moment when they perceive our eternal earthiness ! "

The author would have been well advised to omit the Son of God as in any sense comparable with the sons of men. The book from every other point of view is worthy of commendation. The occasional references to the few places the author visited in the immediate neighbourhood of his quiet residence, and the humble folk with whom he conversed, are all charmingly described.

A. E. M.

Companion into Essex. By H. W. Tompkins. London : Methuen and Co. Ltd., 1938. *Price* 7*s.* 6*d.*

This book adds yet another to the valuable series issued by Messrs. Methuen descriptive of the English counties. The writer, Mr. Herbert Tompkins, has fully recorded the historical events associated with the county of Essex, and the book will be valued not only for these but for the knowledge the author reveals of the beautiful scenery in which that part of England is rich. Visitors wishing to break new ground in their search for a varied and attractive countryside could not do better than begin here and take Mr. Tompkins as their mentor. There are many full-page photographs by Mr. Gordon Young. A. E. M.

The Lakeland Landscape. By Geoffrey Clark and W. Harding Thompson. London : A. and C. Black Ltd., 1938. *Price* 7*s.* 6*d.*

Those who wish to know the Lake District could have no better introduction to it than this survey of the landscape by two well-known planners. Those who know the region and wish to preserve it as an unspoilt part of rural England will welcome this book for its excellent analysis and its accuracy of description. The authors fortunately stick closely to their title. There are very few deviations down the side tracks of archaeology, history and " literary associations." Hence the value of the book, for to most visitors the scenery is the overwhelming attraction of Lakeland.

After a general introduction, dealing with the surface and structural features, the landscape is divided into three main parts, the highland region, the lakes and dales, and the fringe, which is under the separate control of three counties. A plea for the preservation of the whole region runs as an undercurrent through the book. Much remains to be done in this direction, but the appendix which

gives a list of properties held by the National Trust makes encouraging reading.

The authors are to be especially congratulated on the landscape map which accompanies the book. Drawn on the scale of two miles to an inch, it forms a guide to the distribution of scenic beauty within an area which could suitably be converted into a national park. Ancient monuments and religious buildings of special interest are shown, and towns and villages are classified according to their interest value. All properties held by the National Trust are clearly indicated. S. C. F.

Swiss Summer. By CHARLES GRAVES. London : Ivor Nicholson and Watson Ltd., 1938. *Price* 10*s.* 6*d.*

A somewhat egotistical description of a very ordinary motor tour through Switzerland. It falls neither into the category of a good travel book, nor into that of a practical guide, though occasional mention is made of hotels and the food obtainable therein. Those who have made a similar trip may perhaps be interested to draw comparisons. The illustrations, chosen presumably from snapshots taken by the author, are of no great intrinsic interest.

I. M. M'G.

Let's Go to Bavaria. By MICHAEL SUTTON. London : Frederick Muller Ltd., 1938. *Price* 5*s.*

A pleasant if somewhat superficial introduction to a journey in Bavaria. Though not of much practical value, it is interesting and gives a good survey of the possibilities of that country. The letterpress is clear and the photographs are well chosen. I. M. M'G.

Roumanian Journey. By SACHEVERELL SITWELL. London : B. T. Batsford Ltd., 1938. *Price* 8*s.* 6*d.*

Mr. Sitwell tells us that he read no books about Roumania prior to his four weeks' visit there, but judging from the wealth of detail contained in his own, he must have taken copious notes, kept a minute diary, and gleaned much of value from the Roumanian natives with whom he came in contact during his strenuous tour. Accompanying him were Messrs. Costa and Wyndham, two artistic friends whose work has enhanced the volume by the addition of delightful photographs. And the book is further embellished with exceptionally fine scenic views supplied by the Roumanian Press Bureau.

The contents are of such interest that we may expect a new itinerary to be added to those favoured by the more widely travelling class who are at liberty to visit this region in spring or autumn. To enumerate all its intriguing features would entail a list like a vocabulary. Chief among them the reader will enjoy the descriptions of Sinaia and its famous wild raspberries, Bucharest with its countless *gradinas* and their excellent cuisine, the Danube delta around Valcov—the Roumanian Venice—and its caviar fishermen, the painted churches of Jassy and Voronet, and the peasant costumes of the Bucovina and Bessarabia. Information is furnished with regard to peasant fairs, gipsy music and Oltenian rugs. In fact, having consulted Mr. Sitwell, the intending tourist may go armed with previous knowledge on almost any topic in which he may be interested. There are also interesting dissertations on the Laetzi Tziganes, the Skoptzi sect, the Jews, the Lippovans, and others of that medley of races the history of whose settlement in Roumania is so baffling and so mysterious. J. G.

So You're Going to Scandinavia! By CLARA E. LAUGHLIN. London : Methuen and Co. Ltd., 1938. *Price* 10*s.* 6*d.*

Miss Laughlin has added this book to her previous eight volumes with parallel titles at a time when an increasing number of people are thinking of the Scandinavian countries as peaceful and cultured holiday centres. She purposely

writes a guide-book with a difference which blends many interesting details about the spirit and history of various places with valuable information about food and hotels. The glory of Sweden may lie in its lovely towns and glass of impeccable taste, but it is none the less gratifying to know where one may consume the most appetising and original food at reasonable prices. It is also useful knowledge that, as Stockholm is rather short of hotels, accommodation should be reserved and the reservation checked in good time.

There is no attempt at sensational writing ; the style is chatty, and in its simplicity at times verges on the ridiculous. There are a few misconceptions : " When Denmark lost Schleswig-Holstein, which was her richest farming section, she felt as if she must starve to death, with so little left to her for agriculture except the great, black, heath-covered heaths or moors of Jutland " (p. 43). Undoubtedly Denmark felt the loss of Schleswig-Holstein acutely, but she had still the rich lands of East Jutland with those of Fyn and Zealand.

Mr. Carleton Smith contributes a section on Finland, to which Miss Laughlin adds some useful information about travelling there. This, the least known of the Scandinavian countries, might have received fuller treatment. There are sixteen photographs, but only two (end-paper) maps of somewhat indifferent quality.

T. W. F.

Der Ostseeraum (" Macht und Erde " Series). By Wulf Siewert. Leipzig-Berlin : B. G. Teubner, 1938. *Price* RM. 1.35.

Written with typical German thoroughness, this brochure deals with the geographical, cultural and racial foundations of the countries encircling the Baltic Sea, and with the influence, results and controversies of the Great War, together with the present-day conditions. The latter are naturally discussed with a considerable bias in favour of the German point of view, and the neighbouring states are advised of the advantages of a *rapprochement* with the Reich ; but nevertheless the book as a whole will undoubtedly be of use to students of conditions in that area.

I. M. M'G.

In Praise of Sweden. By Maxwell Fraser. London : Methuen and Co. Ltd., 1938. *Price* 7*s.* 6*d.*

The Arm-Chair Traveller, for whose benefit I write and to whose ranks I belong, will not find this a satisfactory book to read straight through. It gives one the feeling of having " done," in the American sense, a great many places at top speed, noting their names, churches, museums and historical features. As a grand kind of guide-book, however, Miss Fraser's book is good and should succeed in inducing people who have never been there to visit Sweden.

Sweden is an ideal country for tourists. There are ample interests and amusements to suit many tastes and reasonable charges to suit many purses. The chief among many sports are bathing and boating in summer and ski-ing in winter. The country has been blessed by freedom from war for over a century and has known civilising influences for countless ages. Dogs, horses and cattle are known to have been domesticated there four thousand years ago. It has great natural beauty and its people are friendly and kind to strangers. Those who speak only English will seldom find difficulty in making themselves understood. The book contains twenty-six excellent photographs and a map.

H. C. H.

Lapland Journey. By Halliday Sutherland. London : Geoffrey Bles, 1938. *Price* 10*s.* 6*d.*

A journey to Lapland may be made in summer in relative comfort by spending twenty hours in a train equipped with sleeping berths and fifteen hours in a bus. Halliday Sutherland's journey was made in April, May and June, months denied to most people. He saw Lapland under snow, and experienced the still, cold days which proved less trying than the windy days of Helsinki, though to the

envious it may be some consolation that the melting of the snows was followed by the resurgence of plant and (it is made abundantly clear) insect life.

The travels of our author were leisurely and his style is discursive and anecdotal. It is well that it should be so. Lapland is a country for thought and reflection ; its interest lies partly in its beauty, partly in the courage and enterprise of its inhabitants, but not least in its remoteness and solitude. The book is of absorbing interest as a travelogue. It does not pretend to be a contribution to scientific knowledge, and is merely the story of one who has made an adventurous journey, partly by reindeer sledge but also by trains and boats and buses, and who has obviously enjoyed it. It owes at least part of its interest to the character of Dr. Sutherland, whom we follow with considerable interest on his journey to the Arctic coast at Liinahamari, across into Norway, and back through that part of Finland which, projecting into the mountains, is perhaps the most inaccessible of all. The last chapter carries us almost, but not quite, to Thule : a methodical writer would have taken us to that little hamlet ; but we are left, like Moses, to view the promised land from a hill-top and to know that there is a place of deeper interest beyond the horizon. T. W. F.

Finland in Summer. By F. J. North. Cambridge : W. Heffer and Sons Ltd., 1938. *Price* 10*s.* 6*d.*

Dr. North, of the National Museum of Wales, is already well known for his works on the evolution of the Bristol Channel and on coal and limestones. It must not be thought, however, in view of the author's reputation, that we have here a scientific textbook or a study in regional geography. This is an account of part of the travels of an English family in Finland, written by one trained in the observation of landscape and not excessively anxious, as are so many writers of travel books, to reveal his own personality. It is well illustrated by a large number of attractive photographs of well-chosen subjects, and will give pleasure to many to whom such works do not usually appeal.

The author and his family went and saw and the country conquered ; they found Finland " inexplicably attractive in the sombre grandeur of its forest-girt lakes, and in the wild beauty of its desolate fells," with " an hospitable, industrious and cultured people." The story of their travels is simply told in an easy and pleasant style. There are many digressions dealing with such subjects as the literature of Finland, including the *Kalevala*, the art and general outlook of the people. Journeys described take the reader from Helsinki to Lake Laatokka (Ladoga), and then in leisurely fashion through the lakes region of south-central Finland to Oulu and the Arctic Ocean. One may wish for a greater abundance of sketch-maps and a rather fuller account of the geological and geomorphological features, but Dr. North has given a faithful and illuminating picture of the country and of its enterprising and active inhabitants.

T. W. F.

Iceland ; A Land of Contrasts. By Hjalmar Lindroth. Translated by A. B. Benson. Princeton : Princeton University Press ; and Humphrey Milford at the Oxford University Press, 1937. *Price* 16*s.*

Land of Ice and Fire ; A Journey to the Great Iceland Glacier. By Hans Ahlmann. London : Kegan Paul, Trench, Trubner and Co. Ltd., 1938. *Price* 12*s.* 6*d.*

We have here two books on Iceland, both of them translations from the Swedish. They are, however, of very different calibre. Professor Lindroth is an expert linguist, and has thus been able to live among and converse with the people in the remoter districts, besides making a thorough study of Icelandic literature. To all he sees and hears he brings an astute mind, and the result is a penetrating and authoritative account of the people and civilisation of modern Iceland. Isolated geographically, and bound culturally by the tradition of the sagas, the people have changed little in a thousand years, and the impact upon them of modern civilisation makes a fascinating study. The book is written in a

style which is simple and clear, and every sentence makes its point. For this a large measure of praise must go to the translator, who has carried out his task brilliantly. It may be read through or browsed in, according to taste, and the reader will find a wealth of information on every page. We learn of the life of the people on the farms and in the towns, of what they eat, how they dress and work and occupy their leisure ; we learn of their sports and dances ; of their medicines and their " auld wife's remedies " ; and of customs and superstitions fast dying out ; finally there are two more specialised chapters on the language and literature. The book should certainly be in the hands of all who visit Iceland, and of all who wish to know more of this people which has retained its ancient culture through ten centuries of struggle with poverty and privation.

Professor Ahlmann has also attempted to give an account of the life of an Iceland farmer, but in his case the account is incidental to the main purpose of the book, which is to describe an expedition undertaken for scientific purposes to the Vatna Jökull. Unfortunately the two themes have been rather injudiciously mixed, and partly on this account, and partly owing to the author's habit of inverting the chronological order of events in an attempt to obtain a dramatic effect, it is extremely difficult to follow the movements of the expedition. The book, in fact, shows signs of having been written hastily while the author was still flushed with the triumph of achievement, and though it contains much of interest it is marred by the manner of its presentation. Thus the discerning reader is not likely to share the author's opinion either of the failure of " most other expeditions," or of the unqualified success of this present venture. (Two of the party were incapacitated by " trench feet "—surely an avoidable complaint.) The translation is not more than adequate, and in such a " popular " work it should certainly have extended to the conversion of metric into English units of weight and distance. A rainfall quoted in millimetres does not mean much to the ordinary reader in this country. J. Y. M.

Soviet Tempo. By Violet Conolly. London : Sheed and Ward, 1938. *Price 7s. 6d.*

Soviet Tempo describes a journey to Moscow, the Black Sea resorts, Baku, Tiflis, and various places in Armenia, leaving the country by Odessa. Travelling third class and stopping at small hotels, the author had ample opportunity for chatting with the common people and obtaining first-hand information. She has already given us *Soviet Economic Policy in the East* (1933) and *Soviet Trade from the Pacific to the Levant* (1935), has lived and travelled in Russia and speaks the language herself. Her reports are thus of much greater value than those of the English-speaking guests of the Union who see only the selected sights and hear only the propaganda news.

It is quite possible that people on so low an economic plane and so poorly educated as the Russian peasantry can only be dealt with by the drastic drill-sergeant methods of the U.S.S.R. But it is none the less pathetic to learn of the complete ignorance of these people of everything outside Russia, and their delight with inferior conditions under the impression that because these are new to them, they are still unknown in the benighted capitalist states. The author does point out directions in which good work is being done ; but these are heavily counterbalanced by the general conditions, which can only be described as the negation of every liberty we enjoy. The story is related in an interesting manner and is illustrated by some good sketches. W. O. L.

ASIA

Le Plateau de Meghalaya (Garo-Khasi-Jaintia) ; Étude géographique d'une région naturelle de l'Inde. By S. P. Chatterjee, M.Sc., Ph.D. Paris : Les Presses Modernes ; London : The Bibliophile, 1936. *Price 10s. 6d.*

The Garo-Khasi-Jaintia Plateau, which hems in the Brahmaputra valley of Assam to the north and overlooks north-eastern Bengal to the south, has never

found a single name. Hence on the analogy of Him-alaya, "snowy region," Dr. Chatterjee, bearing in mind the world maximum of recorded rainfall at Cherrapunji on the southern scarp of this plateau, suggests the name of "cloudy region"—Megalaya. Dr. Chatterjee has produced his well-illustrated regional monograph from personal observations, followed by systematic study in Paris; although the French translation is satisfactory, one hopes the work may be revised in English, which so many Indian writers use with fuller command.

Chapter I deals with the relief and natural regions, leaving an analysis of the structure and morphological evolution to Chapter II. This manner of treatment is no doubt a useful discipline for the student and ensures a plain statement of facts for the reader's instruction. Yet one misses either the visual presentment which kindles the imagination, or an initial statement of the scientific problems which have to be tackled. The criticism is made here not so much with regard to this particular work as in recognition of a general drawback. A loss of vitality is almost inevitable when a geographical thesis is prepared in Europe about a distant homeland which fades from the memory in absence; moreover the region can only be studied afresh when, the thesis completed, the student returns. By that time he is without the opportunity for fresh discussion with the masters with whom he has worked, who may themselves not have seen the region. This difficulty can only be relegated, so far as India is concerned, either when a new generation of competent field-workers have trained themselves there (no easy task in view of the introspective traditions of the Hindu mind), or by help of collaboration in the field between Indians and Europeans of different schools.

The study of the morphological character of the plateau is thorough, and besides carrying the geological memoirs of the Survey of India a stage further by field observations, the author pulls these together in a competent survey of land forms, which are summarised in a useful morphological sketch map. A study of climate is based on the recent advances made possible by aerial observation. The increasing insistence upon the cyclonic character of the monsoon, and upon the contact of wind currents at different altitudes, is exemplified by regional detail. The high rainfall of Cherrapunji may be occasioned by the direct passage of cyclones thither from the Bay of Bengal. The vegetation is next analysed and mapped. Increasing altitudes cause a succession from tropical, temperate, and even "alpine" zones, the latter being ascribed to the winds, more severe than on the Himalayas at the same altitude. The diminishing rainfall of the plateau northwards of course explains the more xerophytic type of trees, including the Khasi pine, found there; but the grass cover of the plateau surface is attributed to the smelting of iron ore found in veins of the gneiss and granite, iron having been exported as hoes from this region for centuries.

The people and their frank open ways are described with sympathy; the author notes their freedom from bloodthirstiness in contrast with the savagery of the Nagas only a few hundred miles to the north-east. Although the writer insists upon the democratic character of the matriarchal and tribal institutions both of the Garos and of the Khasis among themselves, it is noteworthy that the hardy Khasis of the plateau established themselves as overlords amongst the less vigorous folk of the malarial forested valleys to the north. A. G.

China Only Yesterday. By Innes Jackson. London: Faber and Faber Ltd., 1938. *Price* 9*s.*

This is one of those easily written books of travel which flavour their descriptions and information with a strong personal note. They may be considered as typical of our modern literature as well as of the present-day desire for escape beyond the frontiers of everyday life. Miss Jackson relates her wanderings since days at Oxford, whence she set out to discover what a teacher had called "The beating heart of the Chinese people," as heard in their elegant poetry with its constant play on classical allusions, which is so apt to make small appeal to the materialistic mind of the West.

We follow her movements with interest from Shanghai to Nanking and from Nanking to Wuchang, with visits to Peking, Suchow and Hangchow. These places are well described with the freshness of first impressions made on a sympathetic mind. Miss Jackson must have made contacts with those who could not only show her the modern life of China as it is, but could guide her note-taking so as to produce a book that is not only readable but which also gives a satisfactory description of China as it had been. Every one of the places of which she writes has known red ruin since, and the cities of millennial traditions have been bombed and burned. The effort to make one of the proudest nations of the world accept the rule of Japan, with its barbarous ferocity, and to forget her marvellous past, cannot but make the reader regret that such a " Yesterday " should perforce be followed by so very different a To-morrow. G. B.

Oriental Odyssey. By Bob Davis. London : Stanley Paul and Co. Ltd., 1938. *Price* 12*s.* 6*d.*

The title is rather ambitious for the story of a trip along the beaten track across the Pacific to Japan, Shanghai and Peiping. The author's observations, however, by no means follow the guide-book information ; he has picked up many stories and sidelights relating to Chinese and Japanese customs, and has given us an interesting and readable book. There are thirty-four illustrations, all good. W. O. L.

AFRICA

The Unveiling of Timbuctoo. By Galbraith Welch. London : Victor Gollancz Ltd., 1938. *Price* 16*s.*

The author, a fervent admirer of Caillié, recently made a journey under modern conditions and with modern transport over much of the ground traversed by the famous explorer a century ago, and with the help of the latter's own volumes has written this book about Caillié's wonderful feat. It was wonderful. Timbuctoo was for centuries a name, a centre of mystery, of legend, and of world-wide interest, defying every effort of the white man to approach it. The first to enter was a Scot, Major Laing, who reached Timbuctoo not long before Caillié but was murdered before he could return to civilisation. From him nothing of the mysterious city was learnt.

Caillié had no money and no backing of any kind. He prepared himself years in advance by outwardly becoming a Mohammedan and learning to speak Arabic and local native dialects. He left the West Coast of Africa and travelled throughout as a Moor, he had nothing but a few pounds' worth of trade goods, he had no scientific knowledge and no geographical instruments, he was consumptive and frail, small and mean looking. Through unknown and unexplored savage country he crossed mountain, forest and swamp, and lay for months near death in a native hut. Yet he not only reached Timbuctoo but escaped from it alive, and after an equally appalling journey across the Sahara reached Tangier. His journey on foot occupied a year and a half, but he accomplished his object and was the first white man to make known to civilisation the secret of Timbuctoo, and incidentally to pave the way for France's great African Empire. No praise could do justice to his tenacity. But he has not been fortunate in his present biographer : there is an enormous amount of meaningless and irritating padding. Most of this can only be imaginary. It is unworthy of its subject and makes tedious reading. S.

Airman Lost in Africa. By Carel Birkby. London : Frederick Muller Ltd., 1938. *Price* 15*s.*

Current phraseological vulgarisms no doubt impart a graphic local colour : but a journalist should be able to avoid the inartistry of overdoing it. Mr.

Birkby accompanied a pilot dispatched from Cape Town to fly up the west coast to the Congo in search of a Swiss youth gone amissing on a record-breaking attempt. The two searchers spend an eventful three weeks, and return by an inland route, no trace of the vanished airman or his plane having been found. Journalist Birkby takes full advantage of his opportunity to recount his adventures. It is an exciting narrative : the " take-off " from Broken Hill, described on page 246, makes an airman's blood run cold to read. His opening chapter—" Wind Up "—notwithstanding, one retains the impression that the author feels himself to be a bit of a dare-devil.

The photographs have been rather obviously levered into the story—plate XXIV is unblushingly flagrant—and even an unpractised eye can spot that the aeroplane depicted " at Cape Town " is a different machine from that shown in plates XIII and XIV, although the identification letters are almost the same ; yet all three pictures are described as representing the aeroplane of the search. D. B. C.

The Drama of Madagascar. By Sonia F. Howe. London : Methuen and Co. Ltd., 1938. *Price* 15*s.*

The French edition of this fascinating book was crowned by the Académie Française, and the somewhat abridged English version should find eager readers among those interested in colonial development. Part I deals with Madagascar as the island of disappointed hopes, where English and French enthusiasts initiated efforts at colonisation and development, all ending in disastrous failure. It contains the amazing story of Baron Aladar de Benyowsky, the Polish adventurer who tried to establish himself as King of Madagascar. Part II deals with Anglo-French diplomacy, in which the determined Scot and patriot, Robert Farquhar, the versatile Sergeant Hastie, runaway son of an Irish miller, the imperially-minded Hova king Radama I, the bloodthirsty persecuting queen Ranavalo, Protestant missionaries and Jesuit Fathers play their part in a highly interesting drama.

But France was to win the day, and Part III tells of the conquest and pacification of the island by General Gallieni, for whose enlightened and successful policy the authoress has unbounded admiration. She is to be congratulated on the admirable way in which the conflicting claims of Catholic and Protestant, French and British, are impartially weighed, and the balance throughout is justly maintained. D. R.

St. Helena 1502-1938. By Philip Gosse. London : Cassell and Co. Ltd., 1938. *Price* 15*s.*

". . . the poor forgotten orphan of the British Empire. Once upon a time she was the pampered darling of the Honourable East India Company. Given just a little help, a little encouragement, and a fair share of their own land to cultivate, and a voice in the government of their native island, the St. Helenians would be the happiest and most contented race in the world."

This is the considered opinion of the author, after writing a painstaking account of the long and checkered history of the fertile and mountainous island hidden in the South Atlantic over a thousand miles from the African coast. Discovered by the early Portuguese navigators, held by the Dutch till they went to the Cape, taken over by the East India Company in 1637, it was held by them for one hundred and eighty-two years. When Napoleon was imprisoned there the British Government took control of the island, but as this period has been fully dealt with by several writers, Mr. Gosse wisely does not enlarge on it. He concentrates rather on the years during which the East India Company ruled, and he has gone through the records of the Company, as well as the writings of many travellers, in order to give a comprehensive account.

Slave labour, with its attendant horrors, was regarded as a matter of course in the seventeenth century and sullied the life of this beautiful and health-

giving island, where slavery ended very nearly within living memory (1832). Military Governors, good and bad, most extraordinary and perverse parsons, disgruntled officials, and a dragooned people, with now and again a fine doctor, carried on the social, combative and economic life of the place and moulded the conditions which are still to some extent apparent. Revolts and mutinies were not infrequent, the distilling of spirits and the unlimited consumption of rum punch did not help, and financial embarrassment had frequently to be met. After the death of the famous prisoner and the withdrawal of attendant troops, the fortunes of the island declined. The vegetation had been eaten up by countless goats, the valuable land had been portioned out to a very few, and ships did not call as formerly.

There are many good illustrations, including reproductions of the portraits of celebrated Governors, and there is an extensive bibliography. The work will be valued for the light it throws on early colonial administration.

W. L. C.

AMERICA

Red Hunters of the Snows. By Philip Godsell. London : Robert Hale Ltd., 1938. *Price* 12*s.* 6*d.*

Apart from the title-page, which seems to have developed into a Preface, and the illustrations, in which the value of a margin as a frame to the pictures is ignored, in this book there is absolutely nothing to criticise. For the reader who is interested in Northern Canada it is a perfect joy to read. Most books dealing with this area, so rich in adventure and daring, deal with the period before the North came under the rule of Canada. Mr. Godsell, after an adequate review of that period, proceeds to picture things as they are to-day, or at least as they were during the time of his personal service up to the arrival of the aeroplane. His personal experiences picture a new era, of which he saw the earlier developments and could foresee others still later. One of the most charming features is the author's evident interest in the native tribes and their varied responses to the White invasion. He made this his special study in his changing spheres of activity, and his sympathetic attitude permitted of a better understanding than has yet been reached by any other writer. A delightful book to read, full of humour, and full also of enlightenment for the reader. The author's work and its difficulties were gaily faced, and that gaiety he has skilfully imparted to his readers.

J. G.

Redskin Interlude. By Clare Sheridan. London : Ivor Nicholson and Watson Ltd., 1938. *Price* 15*s.*

The author of this charming book is probably known more widely as a sculptor than as an author, though she has exercised both arts in many lands. Her American journey, which forms the subject of this book, was undertaken for the purpose of joining an American group of art students in an Indian Reservation in the far West. Her solo motor drive across the continent to the Rocky Mountains is described in a style which at once captures the reader and shows the writer's power of adapting herself to new conditions. Without this power in a quite unusual degree her residence among the Red Indians would have been brief. As it was, however, one gathers that she soon came to understand them and to appreciate their points of view, and finally was adopted by them as a member of their race. The details of this and of many other ceremonies are most interesting.

Mrs. Sheridan crossed the International boundary into Canada and found the treatment of the Indians in their reservations there much more helpful and friendly than south of the International frontier. In Canada, even in the worst phases of the trade competition between the Hudson's Bay Company and the Montreal North-Westers, the extermination of the Indians was never the aim of the White traders. They did not covet the land of the Indians, but only a

larger share in their trade, and this implied a certain co-operation between the two races rather than the extermination or even the expropriation of the natives. The writer has some plain-speaking regarding their treatment even in modern times in the southern States. The last chapter of the book, well documented, consists almost wholly of an indictment of the Indian policy of the United States to-day, emphasising the need for not only legislative but also executive reforms in giving effect to laws already in existence. The book is a wonderful picture of the Redskin as he is to-day, drawn as only an artist could draw him ; but the " sting in the tail " is very severe. J. G.

U.S.A. (" Modern State " Series). By R. B. Mowat. London : J. W. Arrowsmith Ltd., 1938. *Price* 3*s.* 6*d.*

An excellent little book on a subject of which most Britishers are woefully ignorant. The author was a professor in the U.S.A. for several years and travelled widely in that vast land. He is therefore able from first-hand knowledge to give a highly appreciative picture of American life, social, political, cultural and economic. More than half of the book is devoted to modern times and is particularly helpful on the Roosevelt Experiment. It should be read as a corrective by those who think of America as being peopled only by millionaires, film stars and underworld gangsters. D. R.

The Colorado Delta. By Godfrey Sykes. New York : American Geographical Society Special Publication, No. 19, 1937. *Price* $4.00.

Through the completion of the Boulder Dam, the Colorado River has entered on a new phase of its history, and the publication of this monograph therefore comes at a most opportune moment. It deals with the past history of the river. It includes a brief summary of its early exploration and navigation, with photographs of the original charts ; but the bulk of the work is based on the author's own observations extending over a very long period of years. Needless to say, the future behaviour of the Colorado will be closely watched by geologists, geographers and engineers alike, and all interested will find this book a mine of information for reference and comparison. The striking selection of air and land photographs which are used in illustration calls for special mention. T. F.

Physiography of the Eastern United States. By Nevin E. Fenneman. London : McGraw-Hill Publishing Co. Ltd., 1938. *Price* 36*s.*

Seven years ago Fenneman's first volume made its appearance. The book was immediately recognised as destined to remain for many years the standard work on the geomorphology of the western half of the United States. The companion volume on the Eastern United States has been awaited with expectation ever since. It does not belie its promise.

The boundary between East and West is placed at the eastern limit of the Great Plains. Continuing the treatment by physiographic provinces—as defined by the author at the request of the United States Geological Survey—each of the thirteen chapters deals with a recognised major geomorphic unit, the Central Lowland being split in two for convenience. The relative area and importance of the various divisions is partly indicated by the space allotted them, the province of the Coastal Plain receiving 120 pages, and the Adirondacks 18. Within each such unit the characteristic and the peculiar landforms of the area are considered in turn.

The analysis of detail is not allowed to obscure the broader issues and shows a masterly grasp of fundamental principles. An attempt is made throughout not merely to describe specific features, but to account for them. Where difference of opinion exists both views are presented, the critical elements sharply focussed, and the balance of opinion fairly weighed. Thus reference to the Pleistocene terraces of the Coastal Plain raises at once the question of their

marine or fluviatile origin. On pages 156-158, the Piedmont region offers opportunity for a sound discussion of the much-vexed question of multiple peneplains. The issue is carried further in the classical section of the Ridge-and-Valley Province, where attention is directed to the confusion introduced by the failure of many observers to define clearly the criteria used to determine the levels of ancient peneplains. The chapters on the Central Lowland and Superior Upland give lucid accounts of the repeated drainage changes caused by adjustment to substructure, complex glacial interference, crustal warping and strandline shift.

The increased attention given to geomorphology in America during the last decade has yielded such a mass of new data that the author must have hesitated to initial the galleys lest they should need revision before the page-proofs reached him ! As it is, important and unexpected facts about the sea-floor sediments and the canyons of the coastal shelf have come too late to be included. And yet the treatment is so sound that such new data seem to find their place without necessitating the retraction of what has been written.

Possessors of the earlier volume may regret the absence of further physiographic diagrams by Guy Harold Smith, or may comment on the indifferent screening of some of the half-tone blocks. But such criticism is disarmed by a prefatory explanation : " The illustrations, without exception, are designed to clarify the text, not to ornament it. No preference whatever is given to recent photographs over older illustrations already published. Assistance in building an adequate mental picture is the sole criterion. The maps at the end of the volume are designed primarily to enable the reader to find the localities mentioned in the text. Some of them are also topographically expressive. For that purpose some generalisations are better shown on Lobeck's Physiographic Diagram of the United States. The serious reader will profit by keeping that map constantly at hand."

In a few instances this apologia has been allowed to cover deficiencies where the criterion of " an adequate mental picture " would have been better served by redraughting the original illustration. The map of " surficial formations in North Carolina " (p. 30) will appeal only to one already familiar with the geological map of that region, and the lack of uniformity in size, framing, shape and crowding of the six glacial maps on pages 492-493 suggests a labour-saving subterfuge. These, however, are insignificant defects in seven hundred pages of careful writing.

The volume is not overloaded with documentation. No attempt is made to include a complete bibliography. " The student of the problem is assumed to know how to follow a clue."

At the outset the author emphasises the fact " that the goal of science is explanation rather than mere description." Herein lies the main merit and value of the book. No serious student of geomorphology can afford to be without it. G. B. B.

OCEANIA

The Trumpet is Mine. By Cecil Lewis. London : Peter Davies Ltd., 1938. *Price* 8*s.* 6*d.*

This title is the literal translation of the name for a district in Tahiti, that " Eden ravished " where Mr. Lewis enjoyed what he modestly describes as a holiday " of some weeks." Mr. Lewis, having looked forward all his life to such an opportunity, had steeped himself in their glamorous past and was not unfearful of what the present might have brought to these islands. He sums up the gifts of Western civilisation as " syphilis, gonorrhea, cholera, smallpox, tuberculosis, alcohol and Christianity," and points to " the mess " in which " the West, with all its self-abrogated superiority, with all its Nietzschean will to power, with all its idolisation of effort and the chimaera, progress " has landed us. Against this he pits his book, which he has " packed with anecdote

and incident, partly to interest the reader and carry him along and partly to give a true picture of what life is like there to-day." The life, it appears, though not what it was, is still an idyll, skilfully and lovingly painted by Mr. Lewis in colours as bright as the butterfly's wing.

But the ethics of the conflict between civilisations are the pill, and the gilt is very nice without it. In any case Mr. Lewis disarms criticism by a candid passage of arms (real or imagined) with his father (pp. 257-262). The book is radiant, sun-drenched, frankly carnal. We are indebted to " beauty indestructible " for its inspiration.

POLAR REGIONS

Over the North Pole. By George Baidukov. London : George G. Harrap and Co. Ltd., 1938. *Price 5s.*

It is just a year since three Russian airmen made history by flying from Moscow non-stop over the North Pole to Portland on the Pacific coast of America. Signal as was their feat of daring and endurance, the credit must go to the Soviet technicians who designed, built and equipped the airframe, navigational instruments and power unit—a single one at that.

Into a hundred tense, laconic pages the blind-flying specialist of this likable and unassuming trio compresses his account of the epic flight. Its lesson appears to point to three things : the paramount importance of unfailing cabin heat, even with engine throttled down, abundance of oxygen for all personnel, and very liberal provision of de-icing fluid for wings and propeller.

The supreme confidence which the aviators must have had in their single engine testifies very strikingly to the skill of U.S.S.R. aero engineers.

D. B. C.

The Cradle of the North Wind. By A. S. T. Godfrey. London : Methuen and Co. Ltd., 1938. *Price 8s. 6d.*

Apart from the inappropriate title, which cannot in a literal sense be applied to North-East Land, Spitsbergen, this is a lively and entertaining book. The author had crossed Greenland with Martin Lindsay before he joined the Oxford University Arctic Expedition of 1935-1936. Survey was his main work, but zest for the Arctic life was the motive that took him north. And he conveys to the reader much of the enjoyment and a few of the drawbacks of the polar traveller's experience, together with many reflections on his own thoughts and those of his companions. He writes with fluency and frankness about the life, and records a great deal that is of interest concerning animal life, based particularly on a month's cruise with a Norwegian sealer. It is a welcome book because the author makes no claim to be informative and succeeds in being entertaining. There are two good maps.

R. N. R. B.

GENERAL

The First Hundred Years of the Geological Survey of Great Britain. By Sir John Smith Flett. London : His Majesty's Stationery Office, 1937. *Price 7s. 6d.*

In 1935 the Geological Survey of Great Britain, which is the oldest national Geological Survey in the world, celebrated its Centenary, and in this volume Sir John Flett has given a graphic account of its history throughout that period. The greater part of the book is made up of eight chapters dealing successively with the story of the Survey under its first seven Directors. De la Beche, Murchison, Ramsay, Archibald Geikie, Teall, Strahan and Sir John Flett himself in turn guided the destiny of the Survey, and the method adopted in writing the history brings out clearly how the personality of successive Directors has influenced the lines along which progress has been made.

An account is given also of the ceremonial opening of the new Museum of Practical Geology and Offices of the Survey which chanced to coincide with the time of the celebration of the Centenary. In a valuable appendix there is a fully annotated list of the staff during the hundred years. The volume has an additional appeal in the inclusion of portraits of many of the famous geologists who have been connected with the Survey.

Than Sir John Flett no more competent authority could have been selected to write the first official history of the Geological Survey, and the work under review will be acclaimed as a most valuable contribution to the literature dealing with the history of geological science. R. C.

Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for the Year 1936. Parts I and II. London : His Majesty's Stationery Office, Part I, 1937 ; Part II, 1938. *Price* 1*s.* 6*d each.*

Part I summarises the results obtained in the various branches of the Survey's work in 1936. It records also the severe loss sustained by the Survey by the death of Dr. Bernard Smith, who had held the office of Director for less than a year. Intimation is made of the appointment of Dr. E. B. Bailey as the new Director.

Part II contains eight papers, three of which deal with Scottish geology : " The Anthracomyas of the Lancashire Coal Measures and the correlation of the latter with the Coal Measures of Scotland," by Dr. W. B. Wright ; " On a boring to prove the Limestone-Coal Group near Hamilton, Lanarkshire," by Dr. M. Macgregor ; and " Observations on the Direction of Lineation in parts of Shetland," by Dr. T. Robertson. R. C.

Landslides and Related Phenomena. By C. F. Sharpe. New York : Columbia University Press ; London : Humphrey Milford at the Oxford University Press, 1938. *Price* 15*s.*

A book which embodies the results of fifteen years' work in the field in the United States and Canada, and an exhaustive and critical study of the immense literature relevant to a subject that has been recognised in recent years as of fundamental importance in many fields of geomorphology, may be regarded as a valuable essay and a useful contribution to the increasingly important subject of soil erosion and soil conservation generally. Chapters are included on (1) the significance and types of mass movements of soil ; (2) classification of these movements and a study of their causes ; (3) " slow flowage," with reference to creep in temperate *versus* tropical climates, frost-controlled creep in cold climates, solifluction, etc. ; (4) " rapid flowage " (earth flow, mud flow, debris avalanche, landslip and slump) ; and in conclusion (5) the relation between these various types of movements and geomorphic and climatic cycles. There is throughout the work a meticulous care in defining terminology, and the book is well illustrated with photographs. A. Gt.

Hurricanes. By I. R. Tannehill. Princeton : Princeton University Press ; London : Humphrey Milford at the Oxford University Press, 1938. *Price* 16*s.*

The author of this book has had some twenty years' experience of hurricane warnings, both in the field and at the U.S.A. Weather Bureau. He gives in the present volume a comprehensive and historical survey of the subject, written in a popular style for the general reader rather than for the meteorological expert. The book is arranged so that the reader may first obtain a working knowledge of the storm type generally, and then an account, or at least a reference to the occurrence, of every hurricane since 1494 known to have visited the part of the States in which the author is interested. It includes much information regarding the degree and nature of the damage which various storms have brought in their wake. Of interest too is the fact that one of these

storms (Florida Keys, September 1935) gives the world's lowest recorded sea-level pressure *inland* of 26.35 inches.

The text is illustrated with many maps of storm tracks and storm types, and with photographs of damaged areas. A. Gt.

NATURAL HISTORY

Wild Flowers in Britain. By Robert Gathorne-Hardy. London : B. T. Batsford Ltd., 1938. *Price* 8*s.* 6*d.*

As the writer is careful to explain, this is not a complete account of the British Flora. It is a book written by an amateur for amateurs, containing a minimum of technical facts and dealing with the pleasures rather than the science of botany. Charmingly written and well illustrated, it will certainly fulfil the author's wish " to infect others with a passion that can enliven the dullest country walk," and it will form an excellent introduction to the classic handbook of Bentham and Hooker, which provides a master-key to the identification of plants.

Like many another botanist, Mr. Gathorne-Hardy begins with the buttercup, and having stimulated the reader's curiosity he satisfies it in two delightful chapters on " Conspicuous and Common Flowers." He continues to make the study easy by following a classification by habitat which will appeal to the geographer, the chapter headings including " Flowers by the Road," " By the Seaside," " In the Woods," " On the Moors," and " River and Water Meadow." Other chapters deal with grasses, with " foreigners " and with that most attractive family, the British orchids. The mass of detailed information never degenerates into a mere catalogue, and although he does not stray from his main theme, the writer notes his facts in a clear style which captures the attention of every flower lover. His quest for material has led him to explore Britain from Cornwall to the Outer Hebrides, and Scotland has yielded him many interesting finds.

As this is a Batsford book, it is unnecessary to add that the print is bold and the illustrations are beautifully reproduced. D. G.

Wild Birds in Britain. By Seton Gordon. London : B. T. Batsford Ltd., 1938. *Price* 8*s.* 6*d.*

This is one of the most delightful bird books we have seen. There is a welcome absence of scientific classification of the sort which so often causes a book to become a rather formal, if glorified, catalogue of species, genera and families. In this case the birds are grouped according to their natural habitat, so we are pleasantly led on from birds of the garden to birds of the moors, from birds of the lochs and streams to birds of the mountains. It is not the writing of a systematist, but of an open-air bird-lover who knows his subject thoroughly and has for many years learned the habits and peculiarities of the creatures he has studied. After dealing with the groups, there are special chapters on geese, waders, gulls with inland habits, and ducks.

The illustrations are most excellent, including two in colour of the golden eagle. The photographs other than those by the author are by such eminent bird-photographers as Mr. Eric Hosking and other experts in this difficult and painstaking art. There are some admirable word pictures, notably the description of a Highland loch and its bird life in Strath Spey (p. 65), in which we recognise Loch Morlich at the foot of Cairngorm. We would mention also the special interest in the accounts of birds of the ocean, such as the three petrels, the gannet, the shearwaters and the divers ; and birds which live and nest far above sea-level, such as the snow-bunting and the dotterel. Concerning the gradual disappearance of the last, Mr. Seton Gordon has some forceful words to say in his introduction on the iniquities of the egg collector. W. L. C.

ANTHROPOLOGY

Living with Lepchas. By JOHN MORRIS. London : William Heinemann Ltd., 1938. *Price* 15*s.*

This extremely interesting book is an account of four months' residence among the Lepchas, a Himalayan tribe inhabiting the Talung valley in Sikkim. It is not intended to be a scientific treatise for the expert anthropologist, but is a description of the things that interested the author, a distinguished anthropologist and traveller who is reserving his more academic material for a later book. Major Morris has a wide variety of interests and writes of the country, the people, their lives, customs and beliefs in a very readable style, punctuated by delightful flashes of wit. There are many beautiful reproductions of photographs taken by the author, some of which are of outstanding merit.

J. S. H.

BIOGRAPHY AND TRAVEL

The Waveless Plain. By WALTER STARKIE. London : John Murray, 1938. *Price* 12*s.* 6*d.*

The title of this book (taken from a verse of Shelley's) applies, strictly speaking, only to the first ten chapters, in which the author describes his experiences during the Great War. Rejected for military service, he served in Lombardy in connection with the Y.M.C.A., his work consisting chiefly of playing to the soldiers and organising concerts for them. On demobilisation he tramped with his fiddle through southern Italy and Sicily, sometimes alone and sometimes with two or three disreputable companions. Eleven chapters are given to this subject, and of these the one on Syracuse seemed to the reviewer the best in the book. Twelve chapters and an Epilogue still remain, and these, besides containing digressions, are variously devoted to Irish affairs (Professor Starkie returned for a time to his native land), to an account of his marriage with an Italian lady and details of her family, and to a description of the rise and triumph of Fascism. The writer admires Mussolini and praises him for completing the unification of Italy. He defends the Abyssinian War, and affirms that in a secret interview in Rome (January 1935), M. Laval promised to offer it no resistance, in exchange for a pledge that France need have no fear of a future attack from Italy. Although the book was finished only in March 1938, it contains no reference to Italy's attitude to the Spanish Civil War.

There is no map, and the subject-matter is hardly of value from the point of view of the geographer.

M. E. N.

A Modern Sea Beggar. By TEMPLE UTLEY. Edited by FREDA and EMILY UTLEY. London : Peter Davies Ltd., 1938. *Price* 9*s.*

Temple Utley evidently had the sea in his blood. He was a doctor with only one lung, who smoked fifty cigarettes a day and frequently took a lot of alcohol, but he had tremendous grit and ever enjoyed the struggle of sailing day and night through stormy seas. He was patient and long-suffering in the face of recurrent accidents and stupidities on the part of his incompetent helpers, and freely took tremendous risks. The book is chiefly of interest for the personality of Temple Utley, and is exceedingly well edited by his widow and sister ; the reader lives on board the *Inyala* and sees what Utley sees.

Thirty-five days in this small, old-fashioned Cornish yawl sailing from Tenerife to Trinidad taught the three of them many things ; but twenty-two days from Galapagos to the Marquesas with only one helper, who sometimes lost his head when he looked over his shoulder at a big comber following, nearly finished the skipper. Half the time he was ill with septic sores and a temperature. He had all but died of starvation in Albemarle Island (Galapagos) where his most trustworthy companion, a double murderer, reached him with water and

saved him as Sven Hedin did his last follower in the Gobi. His T.B. had apparently been cured, as was Jack London's, but he had seriously undermined his strength, and in Fiji he died.

This charming Philistine, who was convinced that the British Empire was hastening to its fall, this intellectual of wide reading, who abjured civilisation and vowed he would live in the sensuous South Seas, took many chances with his life and finally lost it. He praises the French methods with the islanders, though he laments the islanders' decay. It is an excuse for his determination to remain. He is more than a trifle flippant about the characteristics of Europeans, but he is a very human person, of frail physique but indomitable courage and perseverance, and it is by this last quality that great explorers are made. The account of his short and full life with its strange upbringing, which is appended by his widow (who sailed with him), makes one regret that this delightful sea beggar, who had so many Christian virtues, was without religious belief.

W. L. C.

Beaten Tracks. By J. H. MacCullum Scott. London : John Gifford Ltd., 1938. *Price* 12*s.* 6*d.*

Landing at Montreal, the author and " Nora " proceeded to motor from New York through the North-east and Southern States, along the northern shore of the Gulf of Mexico to the Pacific coast, where they turned northward with Vancouver as their destination. Facing south again, they explored Mexico and returned to San Pedro, whence they proceeded, with consummate nonchalance, to circumnavigate the South American continent in a tramp steamer, re-entering the Pacific by the Panama Canal. Buenos Aires, Rio de Janeiro, Para, Trinidad and other noteworthy places were visited *en route*. The remaining third of the book Mr. Scott devotes to his subsequent voyage *via* Tahiti and the Cook group to New Zealand, which was investigated with some thoroughness, before returning to England by way of Australia.

The youthful author is somewhat careless with regard to the accepted spelling of place-names, and exhibits a tendency to state curtly and as fact a number of things which are little more than his own impressions and which are, to say the least of it, distinctly open to controversy. But he is quick to assimilate dominant features and conditions, and by his writing amply fulfils the promise of the publisher on the dust jacket that this is a fresh and vital book.

D. B. C.

Search for To-morrow. By Rom Landau. London : Ivor Nicholson and Watson Ltd., 1938. *Price* 10*s.* 6*d.*

Mr. Landau leaves us in little doubt that in his opinion a united Pan-Islamic movement would go far towards counteracting the sins and shortcomings of the Western nations in their hitherto oppressive attempts at the development of Eastern peoples. We should like to express appreciation of the extent of the travels and researches upon which this opinion is based, for territorially they covered southern Europe and almost the whole of the peninsula of Arabia, and in them contacts were established with at least a hundred people of influence, including audiences-in-chief with a dozen rulers of varying degree. The linguistic barriers alone would have deterred most Englishmen from such a task, but notwithstanding his limitations Mr. Landau is able to present a succession of concrete statements on religious subjects, some of which he has secured from recognised adepts in the art of using words as a cloak to thoughts. We shall look with interest for a definite outcome from these Conversations. Whatever that outcome may be, it seems certain that we men of warring creeds need to be brought back to the tremendous implicate of that quotation upon which Mr. Landau bases his researches. The happenings of the Veiled To-morrow are surely under the control of the Alpha and Omega Whom he invokes in the stirring words of the motif with which he opens his book.

G. B.

NEW EDITIONS

Soviet Geography. By N. MIKHAYLOV. London : Methuen and Co. Ltd. Second Revised Edition, 1937. *Price* 10*s.* 6*d.*—The publication of a second edition of Mikhaylov's *Soviet Geography* within two years indicates the need in Britain for an economic geography of the region. Theoretically the economy of the Union is planned on the basis of geographical rather than of human, cultural and historical factors, while the author neglects those of military and social strategy. The reader feels that he is shown only the plan and examples of the success of its working ; he is startled by occasional vague sentences from a statistical economist, such as " one of the principal tasks of the country . . . to double or treble consumption during the second Five-Year Plan." The subject-matter—the utilisation of the great natural resources—is well organised, and the chapters on agriculture have more breadth than statistics dressed in the light of enthusiasm for the new order. The style is lively, but the economy of verbs might have been balanced by the quality of adjectives. Emphasis is attempted by repetition of phrase—hardly an efficient method to convince a serious geographer. H. R.

Outlines of Historical Geology. By CHARLES SCHUCHERT and CARL O. DUNBAR. New York : John Wiley and Sons Inc. London : Chapman and Hall Ltd. Third Edition, 1937. *Price* 12*s.* 6*d.*—This book is written primarily for students who require in broad outline an account of the past history of the Earth. Dealing as it does with the main aspects of the geology of North America, it should be a useful guide, not merely to American students, but particularly to those in this country who are in need of a general outline of the subject not overburdened with detail. One would like, however, to recommend the book to a much wider circle of readers. All who are interested in the life of the past, the story revealed by the stony record, will find here a book much to their liking, a brief, connected, well-balanced summary of the evolution of life. A great boon for such readers in visualising the life and landscape of the past is the wealth of illustrations, whether of fossils or of animal restorations. T. F.

Outlines of Geology. By CHESTER R. LONGWELL, ADOLPH KNOPF, RICHARD F. FLINT, CHARLES SCHUCHERT and CARL O. DUNBAR. New York : John Wiley and Sons Inc. London : Chapman and Hall Ltd., 1937. *Price* 20*s.*—A combination of the edition of *Outlines of Historical Geology* reviewed above with *Outlines of Physical Geology* (published 1934 and reviewed, vol. li, p. 121), in itself an abridgement of *Physical Geology.* Together the two volumes cover the whole range of elementary geology at a price substantially lower than that of the sum of the separate parts.

OTHER BOOKS RECEIVED

YEAR BOOKS, REPORTS AND STATISTICS

Canada 1938—The Official Handbook of present conditions and recent progress. Published by authority of the Hon. W. D. EULER. Ottawa : Dominion Bureau of Statistics, 1938. *Price* 25 *cents.*—An annual publication dealing with the major industries and occupations, communications (including airways), labour, education, public finance and vital statistics of the Dominion ; illustrated with authoritative recent statistics.

The Official Year Book of New South Wales, 1935-36. By T. WAITES, O.B.E. Sydney : Government Printer, 1938. *Price* 7*s.* 6*d.* (cloth).

Official Handbook of the Territory of New Guinea. Compiled under the authority of the Prime Minister of the Commonwealth of Australia. Canberra : L. F. Johnston, Government Printer, 1938. *Price* 5*s.*—We are indebted to the

generosity of the mandatory power, Australia, for the first handbook of N.E. New Guinea, and the large islands of New Britain, New Ireland and Bougainville (Solomon Islands). Aspects under review include the history, geography, anthropology and administration of the territories, together with an appreciation of the work of the Christian Missions and some new statistical data concerning population, etc. The handbook is illustrated by many photographs and there are two maps. It is to be hoped it will become, if not an annual, at least a periodic publication.

Report of the Twenty-third Meeting of the Australian and New Zealand Association for the Advancement of Science. Edited by F. J. A. BROGAN. Wellington, N.Z. : Government Printer, 1937, *n.p.*

Statistical Year Book of the League of Nations, 1937-38. Geneva : Publications Department, League of Nations, 1938, *n.p.*

GUIDE BOOKS

Popular Official Guide to the Scottish Zoological Park. By T. H. GILLESPIE. Edinburgh : The Zoological Society of Scotland, Twelfth Edition, 1938. *Price* 1*s.*

British Health Resorts, Spa, Seaside, Inland, including the British Dominions and Colonies. Official Handbook of the British Health Resorts Association. London : J. and A. Churchill Ltd., 1938. *Price* 2*s.* 6*d.*—A brief but comprehensive guide with definite medical authority and without an axe to grind.

Cook's Traveller's Handbook to Paris. By ROY ELSTON. London : Simpkin Marshall Ltd., New and Revised Edition, 1938. *Price* 2*s.* 6*d.*

Guide to Belgium and Luxembourg. Edited by T. G. BARMAN and J. DE GEYNST. London : Thos. Cook and Son Ltd., Twelfth Edition, 1938. *Price* 5*s.*—An entirely revised edition, very businesslike, containing two maps and eight town plans.

Switzerland, together with Chamonix and the Italian Lakes. By KARL BAEDEKER. London : George Allen and Unwin Ltd., Twenty-eighth Revised Edition, 1938. *Price* 15*s.*

BIBLIOGRAPHIES

Handbook of Latin American Studies : Guide to material published in 1936. Edited by LEWIS HANKE. Cambridge (Mass.) : Harvard University Press ; and London : Humphrey Milford at the Oxford University Press, 1937. *Price* 17*s.*—A bibliographical review similar to but larger than that published for the first time in 1936 and noticed vol. liii, p. 282.

Official Map Publications. By WALTER THIELE. Chicago : American Library Association, 1938. *Price* $4.75.—Despite the author's modest disclaimer, this is a sufficiently thorough and very valuable piece of work. It falls naturally into two parts : a section (117 pp.) on what may be termed historical cartography, which, in view of the scope and complexity of the subject, is of necessity cursory, and a more fundamental *raison d'être* in the shape of 153 pages on contemporary Government maps and mapping services. There is also a chapter on the cataloguing of maps, an index, and five specialised appendices.

The information given is naturally most detailed with regard to the maps available of Canada, the United States and South America. The publications of Great Britain, Germany, Austria, Hungary, the Netherlands and Norway are also noted. An obvious recommendation for future editions is the inclusion of other states, especially of France and the British Empire. The efficiency of so much as has been attempted, however, is remarkable in view of internal

evidence that for countries outside of the Americas it has been done practically without personal contacts with the governments or authorities concerned.

The primary appeal of the book will be to the librarian who has not hitherto familiarised himself with the subject. It is planographed, but exhibits none of the defects commonly associated with that method of reproduction ; and it is strongly bound in cloth.

NEW MAPS AND ATLASES

EUROPE

SCOTLAND.—Pictorial Plan of Glasgow.—Scale 5¼ inches to 1 mile. John Bartholomew and Sons Ltd., Edinburgh, 1938. Price 1s. paper, 2s. 6d. cloth.

Ordnance Survey of Scotland.—Publications issued from April 1st to June 30th, 1938 :—

Administrative Maps of Scotland.—Scale Four Miles to One Inch. Showing Burghs, Civil Parishes and Parliamentary Areas, Price 3s. 6d. ; showing Civil Parishes Boundaries Only, overprinted in red, 2s. 6d. ; Outline only, 1s. 6d. ; Outline on Tracing Paper, 1s. 6d. Sheet 1 : Counties of *Ayr, Berwick, Dumfries, East Lothian, Kirkcudbright, Lanark, Midlothian, Peebles, Renfrew, Roxburgh, Selkirk, West Lothian* and *Wigtown.*

Six-inch Scale Maps (revised). Quarter Sheets with Contours in Red. Price 2s. each. *Dunbartonshire*—24 SW. (1933-35). *Lanarkshire*—1 SW. (1932-33) ; 9 SW. (1935-36).

1 : 2500 Scale Maps (revised). With Houses stippled and with Areas. Price 6s. 8d. each. *Dunbartonshire*—18 : 2 (1936), 10 (1936-37), 14 (1937). *Ayrshire*—33 : 9 (1937).

Land Utilisation Maps.—12 *Wick*, 53 *Sound of Mull*, 59 *Iona and Colonsay*, 60 *North Jura and Firth of Lorne*, 74 *Edinburgh*, 78 *Kilmarnock and Ayr.* Scale 1 inch to 1 mile. The Land Utilisation Survey of Britain, London School of Economics, Aldwych, W.C. 2. Price 4s. paper, 5s. linen. Also available in groups as Wall Maps.

These are the most complete topographical sheets ever published. They show all the detail which appears on the Ordnance Survey One-inch Maps, including contours, and in addition, by means of boldly contrasting colours, the use to which the land is put. The chess-board of cultivation is revealed as we would see it if flying over the land in an aeroplane. Heaths, commons, woodlands, gardens, grassland, arable land and industrial areas are shown at a glance. The size and numbering of the sheets are the same as those of the Ordnance Survey One-inch Sheets on which they are based. They are invaluable to every one wishing to understand how the land of Britain is used, for they present for the first time an accurate and detailed picture of the face of the country.

NOTHERN ENGLAND.—*Philip's New Series Large Outline Regional Map.*—Scale 1 : 200,000 (3.15 miles to 1 inch). George Philip and Son Ltd., London, 1938. Price 1s. 6d.

POLAND.—*Poland and Adjacent Countries.*—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938. Price 2s. 6d.

ASIA

CHINA, JAPAN AND MANCHURIA.—*Philip's New Series Large Foundation Map.*—Scale 1 : 5,000,000 (80 miles to 1 inch). George Philip and Son Ltd., London, 1938. Price 1s. 3d.

AFRICA

SUEZ CANAL.—Scale 1 : 250,000. Geographical Section, General Staff, War Office, London, 1938. Price 3s. 6d.

CYRENAICA.—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938. Price 4s. 6d.

NIGERIA.—*Nigeria and part of Chad.*—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938 (revised). Price 4s. 6d.

BELGIAN CONGO.—*Congo Belge, Katanga, Feuille Kipilingu.*—Scale 1 : 200,000. Le Comité Spécial du Katanga. Two sheets. Brussels, 1938.

KENYA COLONY.—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938. (Third Edition.) Price 4s. 6d.

NATAL.—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938. (Second Edition.) Price 4s. 6d.

CAPE OF GOOD HOPE.—Scale 1 : 2,000,000. Geographical Section, General Staff, War Office, London, 1938. (Second Edition.) Price 4s. 6d.

AMERICA

UNITED STATES.—*Topographical Survey.*—Scale 1 : 62,500—*Arkansas*, 3 sheets ; *Colorado*, 1 sheet ; *Florida*, 3 sheets ; *Illinois*, 6 sheets ; *Indiana*, 1 sheet ; *Iowa*, 1 sheet ; *Kentucky*, 2 sheets ; *Louisiana*, 1 sheet ; *Maryland*, 2 sheets ; *Minnesota*, 1 sheet ; *Missouri*, 4 sheets ; *New Mexico*, 1 sheet ; *Pennsylvania*, 3 sheets ; *Vermont*, 2 sheets ; *Virginia*, 2 sheets ; *South Carolina*, 4 sheets ; *Washington*, 1 sheet ; *Wisconsin*, 1 sheet. Scale 1 : 125,000—*California*, 1 sheet ; *Idaho*, 1 sheet ; *Oregon*, 1 sheet ; *Washington*, 2 sheets. Scale 1 : 24,000—*California*, 7 sheets ; *Illinois*, 1 sheet. Scale 1 : 31,680—*California*, 1 sheet ; *Connecticut*, 2 sheets ; *Massachusetts*, 1 sheet ; *New York*, 1 sheet ; *Ohio*, 6 sheets ; *Virginia*, 3 sheets. Washington, 1938.

ATLAS

HARRAP'S NEW WORLD ATLAS.—In Contour Colouring for Junior Classes. New Edition. Edited by John Bartholomew, F.R.G.S. George G. Harrap and Co. Ltd., London, 1938. Price 1s. 3d.

ADMIRALTY CHARTS

MEDITERRANEAN.—*Tunisia, North Coast ; Bizerta Lake Entrance*, No. 1569, Price 4s. 6d., May 1938.

SOUTH AMERICA.—*British Guiana ; Georgetown and mouth of Demerara river*, No. 519, Price 4s. 6d., June 1938.

FALKLAND ISLANDS.—*East Falkland Island ; Port William, Stanley Harbour and approaches*, No. 1614, Price 4s. 6d., May 1938.

JAPAN.—*Yellow Sea, Gulf of Yalu, Yalu Kiang*, No. 3652, Price 4s. 6d., April 1938.

PHILIPPINE ISLANDS.—*Harbours and Anchorages in the Kalamian group*, No. 3401, Price 4s. 6d., June 1938 ; *Mindoro Strait*, No. 3819, Price 4s. 6d., June 1938.